

only 15 branched anal rays (18-20 in *H. ilisha*) and the anal origin is equidistant between the caudal base and pelvic *tips* (pelvic *base* in *H. ilisha*).

Richardson records too few scales in lateral series ("Thirty of them compose a longitudinal row"), since there are at least 40 in the specimen, probably more. *Hilsa toli* (Valenciennes) also occurs in this region (see Table 2), but it has a narrow operculum (as in *H. ilisha*) and the caudal lobes exceed head length (about equal to head length in *H. ilisha* and *H. reevesii*).

REDESCRIPTION OF THE TYPE OF *CLUPEA REEVESII*

Standard length : 295 mm.

Total length : 369 mm., or 14½ inches (approx. 15 inches according to Richardson).

	mm.	%S.L.
Body depth . . . . .	91.0	30.7
Head length . . . . .	84.5	28.7
Snout length . . . . .	21.5	7.3
Eye diam. . . . .	12.8	4.3
Upper jaw l. . . . .	35.0	11.9
Lower jaw l. . . . .	43.2	14.7
Pectoral l. . . . .	47.0	15.9
Pelvic l. . . . .	24.5	8.3
Operculum height . . . . .	35.5	12.0
width . . . . .	24.0	8.2
Pre-dorsal . . . . .	149.4	50.5
Pre-pelvic . . . . .	143.8	48.5
Pre-anal . . . . .	239.0	81.0

Dorsal iii 14 (or iv 13, tips broken) ; pectoral i 15 ; anal iii 15 ; scales in lateral series about 41. In all other respects, this specimen conforms to the description given by Whitehead (1965a).

7. "*Alosa palasah* Russell"  
= *Hilsa reevesii* (Richardson)

(See previous synonymy.)

SPECIMEN. A fish, 140 mm. standard length, *ex* China, collected and/or presented by J. Reeves. Hitherto unregistered, now BMNH. 1963.8.20.1. The bottle still bears two of the original labels, the first reading "*Clupea reevesii* China J. Reeves Esq." and the second "Reeves B51 Hard. 221". Richardson mentions a British Museum specimen of 7 inches ; the present specimen is 7¼ inches in total length and is undoubtedly that examined by Richardson.

FIGURE. Reeves No. β51 shows a fish of 12 inches (305 mm.) and since the Reeves illustrations were usually life-size, the British Museum specimen is probably not the model for the drawing. The illustration shows well the broad operculum characteristic of this species (Pl. 3, fig. 1). The lower third of the body is shown as dark bronze, the upper part silver—the reverse of what would be expected.

NOTE. Richardson identified this fish rather tentatively with Russell's Palasah and at the same time distinguished it from his own *Alosa reevesii* because of differences

in head length, pectoral length and body outline. The specimen is clearly *H. reevesii* and not the Palasah of Russell (1803) (i.e. *Hilsa ilisha* (Ham. Buch.)—see Whitehead 1965a), having a broad operculum, its width contained only  $1\frac{1}{2}$  times in its length. The differences from *H. reevesii* noted by Richardson arise from a comparison of juveniles and adults and can be accounted for by allometric growth. Richardson records 40 scales in longitudinal series (42–45 in *H. reevesii*; cf. 45–48 in *H. ilisha*—see Whitehead 1965a).

8. "*Ilisha abnormis* Gray"  
= *Ilisha elongata* (Bennett)

*Alosa elongata* Bennett, 1830, *Mem. Life of Raffles*: 691.

*Ilisha elongata*: Norman, 1923, *Ann. Mag. nat. Hist.* (9) **11**: 7 (revision; Reeves' specimen examined); Fowler, 1930, *Proc. Acad. nat. Sci. Philad.*: 599 (Hong Kong); *Idem*, 1931, *Hong Kong nat.* **2** (2): 121 (Hong Kong specimens).

*Ilisha abnormis* Richardson, 1846, *Ichth. China Japan*: 306.

*Pellona vimbella* Valenciennes, 1847, *Hist. Nat. Poiss.* **20**: 317 (specimen from Macao).

*Pellona grayana* Kner, 1865, *Reise Novara, Fische*: 328 (Hong Kong).

TYPE. A mounted skin (right side), 295 mm. standard length (total length about 14 inches, caudal tips damaged), *ex* China Seas, presented by J. R. Reeves. Hitherto unregistered, now BMNH. 1964.11.6.4. Underside of base of wooden stand marked "*Ilisha abnorma* H 240 R 81". The specimen is in poor condition, the anterior part of the flank lacking scales and having been sewn up across a large split in the skin and across the gill opening; pectoral fin detached and sewn loosely to body; a specimen of  $14\frac{1}{2}$  inches in British Museum ("dried and varnished") mentioned by Richardson.

FIGURE. Reeves Nos. 81 and 67 are respectively a little larger and a little smaller than the type specimen. Both are recognizably *I. elongata* (Pl. 3, figs. 2 and 3). Detail of head poor in both illustrations.

NOTE. From the keys and descriptions given by Norman (1923) and Chu & Tsai (1958), there is no doubt regarding the identity of the type specimen, assuming of course that Richardson's counts were reasonably accurate. Unfortunately, scale and scute counts are no longer possible. Three other species are reported from China. *I. indica* (Swainson) is a deeper-bodied fish (depth  $2\frac{2}{3}$ – $3\frac{1}{5}$  in length; cf.  $3\frac{4}{5}$  in the type of *I. abnormis*) with 39–45 scales in lateral series (50–55 in *I. elongata*, and "about fifty scales" described by Richardson in the holotype of *I. abnormis*).

A second possible species is *I. novacula* (Valenciennes), again a rather deeper-bodied species ( $3\frac{1}{2}$  in length) with fewer scales (45). *I. brachysoma* (Bleeker) is also a deeper-bodied species with fewer scales in lateral series (42–45). In all three cases, the more slender body in Richardson's specimen distinguishes it, even if the meristic counts are not completely accurate.

The names *Ilisha* and *abnormis* were created by Gray in an unpublished catalogue of British Museum specimens. This catalogue is not now in the Zoological Library of this museum, and appears to have been lost. It was a continuation from the "*Chondropterygii*" of Gray (1851).

REDESCRIPTION OF THE TYPE OF *ILISHA ABNORMIS*

Standard length : 295 mm.

Total length : 356 mm. or 14 inches (approx., caudal tips damaged).

	mm.	%S.L.
Body depth . . . . .	76.0	25.8
Head length . . . . .	67.8	23.0
Snout length . . . . .	19.6	6.5
Eye diam. . . . .	16.0	5.4
Upper jaw l. . . . .	34.0	11.5
Lower jaw l. . . . .	36.1	12.2
Pectoral length . . . . .	37.5	12.7
Pelvic length . . . . .	11.4	3.9
Length of anal base . . . . .	118.0	40.0
Pre-dorsal . . . . .	150.5	51.0
Pre-pelvic . . . . .	116.3	39.5
Pre-anal . . . . .	177.5	60.0

Lower jaw strongly projecting, upper jaw with two supra-maxillae but no hypomaxilla, extending to middle of eye if mouth closed, but not reaching to articulation of lower jaw.

Dorsal with iv 15 rays, its origin equidistant between snout tip and caudal base. Pectoral i 15. Pelvic (rays damaged) shorter than eye, its base a little nearer to pectoral base than to anal origin. Anal with iii 45 rays, its origin under last dorsal ray. Scales—no count possible. Scutes, 21 pre-pelvic, no count possible on post-pelvic (Richardson gives 14 + 13, but evidently missed seven pre-pelvic scutes).

9. “ *Chatoessus aquosus* Richardson ”

= *Konosirus punctatus* (Schlegel)

*Chatoessus punctatus* Schlegel, 1846, *Fauna Japon. Poiss.*, pt. 5 : 240, pl. 109, fig. 1.

*Nealosa punctata* : Herre & Myers, 1931, *Lingnan Sci. J.* 10 (2 and 3) : 236 (3 Hong Kong specimens).

*Konosirus punctatus* : Whitehead, 1962, *Bull. Brit. Mus. (nat. Hist.) Zool.* 9 (2) : 100 (generic review).

*Chatoessus aquosus* Richardson, 1846, *Ichth. China Japan* : 307.

TYPE. A dried skin (left side) mounted on wood, 190 mm. standard length, *ex* China, presented by Reeves. Hitherto unregistered, now BMNH. 1964.11.6.5 The specimen is in poor condition : pectoral detached, dorsal and anal fins damaged, caudal entirely missing. On the reverse side it is marked “ H 230 R 63 ”. This is the only specimen mentioned by Richardson, who gives its length as  $7\frac{3}{4}$  inches.

FIGURE. Reeves No. 63 shows a clupeoid with a filamentous last dorsal ray, but with a rather rectangular suboperculum (Pl. 4, fig. 1). No scutes are shown, and there are about 45 scales in lateral series. Either *Konosirus punctatus* or *Clupanodon thrissa* are possible, but it must be presumed that the figure agrees with the specimen.

NOTE. The specimen conforms to the diagnosis of the monotypic genus *Konosirus* (Whitehead 1962a, p. 100) in the following characters :

- a. Last dorsal ray, although now broken, sufficiently stout to have been filamentous.
- b. Suboperculum with (exposed) anterior and upper margins meeting at obtuse angle, posterior margin rounded (exposed part of suboperculum rectangular in *Nematalosa*).
- c. Outer edge of dentary not strongly flared outwards.
- d. Post-pelvic scutes 14 or more likely 15 (cf. 11–12 in *Clupanodon thrissa*).

REDESCRIPTION OF THE TYPE OF *CHATOESSUS AQUOSUS*

Standard length : 190 mm.

	mm.	%S.L.
Body depth . . . . .	57.0	30.0
Head length . . . . .	47.4	24.7
Snout length . . . . .	9.7	5.1
Eye diam. . . . .	9.3	4.9
Upper jaw l. . . . .	15.0	7.9
Lower jaw l. . . . .	19.0	10.0
Pectoral l. . . . .	33.0	17.4
Pelvic l. . . . .	17.0	8.9
Pre-dorsal . . . . .	92.9	48.7
Pre-pelvic . . . . .	97.2	51.1
Pre-anal . . . . .	146.2	78.0

Dorsal with iii 14 (or iv 13) rays, its origin slightly nearer to caudal base than to snout tip. Pectoral with i 14 rays. Pelvic with i 7 rays, its base below first unbranched dorsal ray, and slightly nearer to pectoral base than to anal origin. Anal (count impossible) moderate, its base slightly longer than dorsal base, about  $1\frac{1}{4}$  in head length. Caudal missing.

Scutes, 19 pre-pelvic, 15 post-pelvic (about 15 + 13 according to Richardson). Scales in lateral series, about 43 or 44 (Richardson, 46).

In all other features (jaws, opercular bones, etc.) this specimen conforms to the diagnosis for *Konosirus* given by Whitehead (1962a, p. 100).

The priority of Richardson's *aquosus* over Schlegel's *punctatus* need not be adhered to since the former is a *nomen oblitum* and there would be little value in resurrecting the name.

10. "*Chatoessus triza* Linnaeus"

= *Clupanodon thrissa* (Linnaeus)

[*Mystus altus* Linnaeus, 1754, *Chinensia Lagerströmiana*—"dissertatio": 26—China, on Lagerström.]

[*Clupea thrissa* Osbeck, 1757, *Dagbok Ostind. Resa*: 257—Canton area.]

*Clupea thrissa* Linnaeus, 1758, *Syst. Nat.*, ed. 10: 318 (name from Osbeck; diagnosis after Lagerström).

*Clupanodon thrissa*: Fowler, 1930, *Proc. Acad. nat. Sci. Philad.*: 599 (Hong Kong); *Idem*, 1931, *Hong Kong Nat.* 2 (1): 76 (Hong Kong specimens); Herre, 1934, *Hong Kong Nat. Supplement*, No. 3: 26 (3 Hong Kong specimens); Whitehead, 1962, *Bull. Brit. Mus. (nat. Hist.) Zool.* 9 (2): 100 (generic review).

*Clupea triza* Linnaeus, 1759, *Amoen. Acad.* **4** : 251.

*Chatoessus triza*: Richardson, 1846, *Ichth. China Japan* : 307 (on Reeves illustration, Canton or Macao).

*Chatoessus maculatus* Richardson, 1846, *Ichth. China Japan* : 308 (specimen from Canton).

*Chatoessus osbeckii* Valenciennes, 1848, *Hist. Nat. Poiss.* **21** : 106.

**SPECIMENS.** None are mentioned by Richardson and there are no Reeves specimens in the British Museum.

**FIGURE.** Reeves No. 224 shows a fairly deep fish (deeper than the preceding species), with an elongated last dorsal ray, a slender maxilla reaching almost to eye centre, and a dentary which is barely flared (Pl. 4, fig. 2). Mouth shape clearly eliminates *Nematalosa*, and two possibilities remain, the monotypic genera *Konosirus* and *Clupanodon*.

The illustration can be definitely identified on three characters.

a. *Snout.* The snout is less pointed than in the preceding figure (Pl. 4, fig. 1) and is a fair representation of the blunter snout found in *C. thrissa* compared with that in *K. punctatus*.

b. *Operculum.* In *C. thrissa* the operculum is slightly broader than in *K. punctatus* and its lower edge is a little higher up on the body. Although the opercular series in Reeves' drawings 63 and 224 are not completely accurate, yet the overall impression gives a good illustration of the differences in opercular shape between the two genera (compare Pl. 4, figs. 1 and 2).

c. *Anal base.* Again the artist has not made an accurate drawing, but the longer anal base in Reeves No. 224 (just over head length; about head length or a little less in specimens of *C. thrissa*) can be contrasted with that shown in Reeves No. 63 (about  $\frac{4}{5}$  of head in both figure and in specimens of *K. punctatus*).

In addition, Reeves' illustration No. 224 shows a slightly deeper fish than in the illustration of *K. punctatus* (No. 63). *C. thrissa* is indeed a slightly deeper fish (depth  $2\frac{2}{3}$ –3 in standard length; cf.  $3$ – $3\frac{1}{2}$  in *K. punctatus* according to Regan, 1917a).

There can be little doubt, therefore, that the illustration refers to *C. thrissa* and not to *K. punctatus*, although Reeves himself was apparently dissatisfied with the painting. In his notes (list of illustrations, dates, etc.—see section on Reeves' illustrations), he states "7th June [1828] *Clupea* sp. now transparent as glass—this badly painted."

**NOTE.** Richardson took the name *triza* from Linnaeus' *Chinensia Lagerströmiana* (1759), not from the *Systema Naturae* (1758), but that was incorrect. The earliest names, *Mystus altus* L., as well as *Clupea thrissa* Osbeck, were inadmissible (*Int. Code Zool. Nomen.* 1961, Art. 3).

The synonymy is cited here because the species was largely based on Osbeck's good description which was written (in November 1750) after examining (a) specimen(s) from the Canton area. In the two Lagerström descriptions by Linnaeus there is no mention of a filamentous last dorsal ray, but this is given in the *Systema Naturae*, presumably on Osbeck's description ("quorum ultimo duplo longior"). Lönnberg (1896) was able to identify a specimen of *Clupea triza* from the Lagerström collection at Uppsala; he too, does not mention the filamentous last dorsal, which was presumably broken off.

II. "*Chatoessus chrysopterus* Richardson"  
 = *Nematalosa* sp., ? *N. nasus* (Bloch)

*Clupea nasus* Bloch, 1795, *Nat. Austral. Fische*, 9 : 429, fig. 1.

*Nematalosa nasus* : Herre, 1934, *Hong Kong Nat. Supplement*, No. 3 : 26 (1 Hong Kong specimen).  
 ? *Chatoessus chrysopterus* Richardson, 1846, *Ichth. China Japan* : 308 (on Reeves' illustration—  
 Canton or Macao).

*Konosirus thrissa* : Jordan & Seale, 1905, *Proc. Davenport Acad. Sci.* 10 : 2 (Hong Kong) (*non*  
*Clupea thrissa* L.).

SPECIMENS. None mentioned by Richardson and no Reeves specimens in British Museum.

FIGURE. Reeves No. 61 shows a deep-bodied fish (depth  $2\frac{1}{2}$  in standard length) with an elongated last dorsal ray and an inferior mouth with a short maxilla (Pl. 4, fig. 3). This is clearly a species of *Nematalosa*, and three species can be considered, *N. nasus*, *N. japonica* Regan and *N. come* (Richardson). There are two principle features shown in the illustration which may help to identify this drawing.

a. *Body depth* : the body shape shown in the illustration strongly suggests *N. come* (depth  $2-2\frac{1}{2}$  in length according to Regan, 1917a). In *N. japonica*, a more slender species judging from the type specimens in this museum, the depth is contained 3 times in length and the head  $1\frac{1}{2}$  times in body depth ( $1\frac{3}{4}$  in the illustration). *Nematalosa nasus* is also rather deep-bodied (depth  $2\frac{2}{5}-2\frac{1}{2}$  times in length according to Regan, 1917a).

b. *2nd suborbital* : in the illustration, the anterior border of the 2nd suborbital is shown as slightly oblique (rather than vertical) and the edge is concave (rather than straight or convex). In *N. nasus* alone, the anterior border is vertical and slightly convex (see Whitehead, 1962a, fig. 4). In all other species the anterior border is oblique, and leaves exposed a small triangular area above the anterior part of the lower limb of the pre-operculum. Such a naked area is not, however, shown in the drawing.

NOTE. *Nematalosa japonica* can be eliminated because of its more slender body. The only record of *N. japonica* from the Hong Kong area seems to be the single specimen examined by Herre & Myers (1931). The Reeves figure probably best fits *N. come*, but this species is not known from so far north (Indo-Australian Archipelago according to Regan). It differs from *N. japonica* in having a deeper body and a lower scute count (11-14 post-pelvic scutes; cf. 13-16—see Whitehead, 1962a), but a more strongly flared dentary. Unfortunately, neither of these two features can be determined from the drawing. Finally, it must be wondered whether Richardson would not have recognized his own species (i.e. *N. come*), especially since he comments on the close correspondence between the ichthyofauna of the northern and southern parts of the western shores of the Pacific ("Report", p. 190).

*Nematalosa nasus*, the remaining possibility, is recorded from the Philippines, China and Japan, and two Hong Kong references appear in the literature (see synonymy). There is a Hong Kong specimen in this museum. The discrepancy in shape of 2nd suborbital might be misinterpretation by the artist, for certainly the dermal head bones are not accurately drawn in any of the drawings. A mistake of

this kind seems much more likely than one in body depth, and the drawing agrees with *N. nasus* and not with other species of *Nematalosa* in failing to show the small naked, triangular area above the anterior part of the pre-operculum. *Nematalosa nasus* is therefore chosen as the most likely species.

12. "*Chatoessus maculatus* Gray"

= *Clupanodon thrissa* (Linnaeus)

(see synonymy under *Chatoessus triza*.)

SPECIMENS. Richardson states that a single specimen was presented by Vachell to the Cambridge Philosophical Institution. There is now no such specimen in the Cambridge collections, and Günther (1868, p. 409) does not list any Vachell material for this species. In 1893, S. F. Harmer, then director of the Museum in Cambridge, listed all fish specimens, but *C. maculatus* does not appear on the list.<sup>1</sup> It may have been one of the specimens destroyed in 1866, during the overhaul of the collections. An account of the Vachell collection is given by Whitehead (in press).

Günther (loc. cit.) listed three specimens of *C. maculatus* collected by Swinhoe from Formosa; these are *Clupanodon thrissa*. Richardson believed *C. maculatus* to be close to *C. chrysopterus*, both sharing the same Chinese vernacular name, but the Reeves figure (Pl. 5, fig. 1) shows upper and lower jaws typical of *Clupanodon*.

FIGURE. According to the Reeves notebook, this figure was painted at Canton in November 1828. Reeves notes 6 or 7 black spots on the flanks, and these are well shown in Reeves No. 109 (Pl. 5, fig. 1). But for the elongated last dorsal ray, this figure resembles *Hilsa kelee* (Cuvier). Apart from the spots it is otherwise similar to the figure of *C. triza* (Reeves No. 224, see Pl. 4, fig. 2).

NOTES. The name *maculatus* was first used by Gray in a manuscript list of fishes in the British Museum. As in the case of other manuscript names (by Forster and one by Broussonet), Richardson accredited the name to Gray even though the list had not been published. As stated earlier, this list never was published and now appears to be lost.

13. "*Engraulis commersonianus* Lacepède"

= *Stolephorus commersonii* Lacepède

*Stolephorus commersonii* Lacepède, 1803, *Hist. Nat. Poiss.* 5 : 381, 382, pl. 12, fig. 1.

*Engraulis commersonianus* : Richardson, 1846, *Ichth. China Japan* : 308 (Reeves specimens ex "China"); Fowler, 1930, *Proc. Acad. nat. Sci. Philad.* : 600 (Hong Kong, as *commersonii*).

*Engraulis japonica* : Günther (*part.*), (*non E. japonica* Schlegel) 1868, *Cat. Fish. Brit. Mus.* 7 : 390 (Reeves specimens ex "China").

*Engraulis chinensis* Günther, 1880, *Rep. Voy. Challenger*, 1 : 73 (Reeves specimens and 4 other Chinese specimens—see below).

SPECIMENS. Four fishes, 79–82 mm. standard length, ex China, presented by J. R. Reeves, hitherto labelled "*Engraulis japonica*" and unregistered, now BMNH.

<sup>1</sup> Harmer's Catalogues (two manuscript volumes) are now in the University Museum of Zoology in Cambridge.

1964. II. 6. 8. II. These are the specimens listed as c-f in Günther's Catalogue (1868, p. 390). All are in good condition. For reasons given below, these fishes should not be regarded as syntypes of *Engraulis chinensis* Günther, 1880.

FIGURE. There is no Reeves figure of this species.

NOTES. As a result of the poor description given by Houttuyn (1782) of a species, *Atherina japonica* (variously interpreted as one of two species of anchovy or a species of round herring—see Whitehead, 1963b), considerable confusion existed in the nomenclature of the Chinese and Japanese anchovies. However, Richardson correctly identified the British Museum specimens with Lacepède's *Stolephore commersonien*. Richardson noted that Cuvier had ranged the latter species "among the anchovies, whose bellies are not toothed" (i.e. the modern genus *Engraulis*). But he observed that the Reeves specimens "show six teeth before the ventrals as fine hairs" (characteristic of the modern genus *Stolephorus*). Unfortunately, Richardson placed *Atherina australis* Shaw (a true member of *Engraulis*—Whitehead, 1964b) in his synonymy of *E. commersonianus*.

Günther (1868, p. 390), overlooking Schlegel's *Engraulis japonica* (a true *Engraulis*), placed the Reeves specimens and some further Chinese specimens in *Engraulis japonica* (Houttuyn). Later (Günther, 1880), finding a difference in finray counts between his *E. japonica* and Schlegel's, he proposed the name *Engraulis chinensis* for the Reeves and other specimens. These specimens appear in Günther's catalogue (1868, p. 390) as:

- a, b, c-f Adult and half grown China  
g-i Adult. Amoy. Purchased of Mr. Stevens

Specimen a is registered BMNH. 1831.12.27.207. It is now an alizarin preparation (standard length 60 mm.). Specimen b is a juvenile (46 mm. S.L.); it is *Engraulis japonicus* Schlegel and was evidently misidentified. Specimens c-f are labelled "J. R. Reeves" but it is not clear why Günther did not record them as such. Specimens g-i are registered BMNH. 1860.7.20.103.6.

Since the Reeves specimens are not positively identified as such in Günther's catalogue, it seems best to regard the three Stevens specimens as the syntypes of *Engraulis chinensis* Günther (four fishes registered but one missing).

Fowler (1931, p. 199; 1941, p. 695) included *Engraulis commersonianus* of Richardson in his synonymy of *Engraulis japonicus* Schlegel, overlooking Richardson's reference to abdominal scutes. However, *E. japonicus* certainly occurs in the Philippines and is also found in Hong Kong waters (B.M. specimens). Closely related to *S. commersonii* is *S. indicus* (van Hasselt), reported by Seale (1914) and Herre & Myers (1931) from Hong Kong. The latter species can be distinguished from *S. commersonii* chiefly by its shorter maxilla (to front edge of operculum, not to gill-opening). Fowler (1931, p. 201) lists only one other Chinese record for *S. indicus*, namely *Engraulis encrasicholus* of Günther (1874) from Chefoo. However, these Günther specimens (collected by Swinhoe) are true *Engraulis japonicus*. *Stolephorus indicus* is well known in the Philippines, and is reported from Formosan and Japanese waters (Hayashi & Tadokoro, 1962). I have examined five Hong Kong specimens of *S. indicus* deposited in the Zoologiske Museum in Copenhagen (Nos. 99-101).



14. "*Coilia grayii* Richardson"  
= *Coilia mystus* (Linnaeus)

[*Mystus ensiformis* Linnaeus, 1754, *Chinensia Lagerströmiana*—"dissertatio": 26, fig. 12—China, on Lagerström.]

[*Clupea mystus* Osbeck, 1757, *Dagbok Ostind. Resa*: 256—Canton area.]

*Clupea mystus* Linnaeus, 1758, *Syst. Nat.*, ed. 10: 319 (name from Osbeck; description mostly after Lagerström); *Idem*, 1759, *Amoen. Acad.* 4 (61): 252, fig. 12 (repeat of 1754 description and figure.)

*Coilia mystus*: Jordan & Seale, 1926, *Bull. Mus. Comp. Zool.* 67 (11): 359 (Hong Kong); Fowler, 1931, *Hong Kong Nat.* 2 (3): 206 (China, compiled); Herre, 1934, *Hong Kong Nat. Supplement*, No. 3: 26 (2 Hong Kong fishes).

*Coilia grayii* Richardson, 1845, *Ichth. Voy. Sulphur*: 99, pl. 54, figs. 1-2 (China seas); *Idem*, 1846, *Ichth. China Japan*: 309 (on type and Reeves illustr.); Jordan & Seale, 1926, *Bull. Mus. Comp. Zool.* 67 (11): 361 (4 Hong Kong specimens); Herre & Myers, 1931, *Lingnan Sci. J.* 10 (2-3): 238 (4 Hong Kong specimens).

TYPE. A fish, 243 mm. standard length (about 10½ inches in total length, caudal tip damaged), registered BMNH. 1855.9.19.1581, presumed *ex* China Seas, sent to British Museum from the Haslar Hospital Museum to which (*vide* Richardson 1844, p. 100) it had been presented by Captain Dawkins, R.N. Although this specimen was listed as type by Günther (1868, p. 405), the jar containing it (with original label) has not been marked as containing a type. Instead a second jar has been labelled *C. grayii* TYPE. This jar contains two smaller specimens, also from the Haslar collection, registered BMNH. 1855.9.19.1157. Richardson (1844) clearly states the length of the specimen from which the description was made (11 inches); his plate (pl. 54, fig. 1), stated to be life size, shows a fish of 250 mm. standard length. The two smaller Haslar specimens are barely 7½ inches.

SPECIMENS. Günther (loc. cit.) lists five specimens under *C. grayii*. The first, indicated as "a", is the type; *b*, is an adult (in alcohol) presented by J. R. Reeves; *c* is another adult (stuffed) also presented by J. R. Reeves but subsequently destroyed; *d* and *e* are the two small Haslar specimens. Curiously enough, Richardson does not mention these Reeves specimens, although the old label on the jar of the surviving (alcohol) specimen has the Hardwicke illustration number on it (H 252 R). This fish, 235 mm. standard length, is now registered BMNH. 1964.11.6.2.

FIGURE. Reeves No. α14 (13½ inches total length) shows a species with seven filamentous pectoral rays and a blunt maxilla reaching only to the pectoral base (Pl. 5, fig. 2). However, the maxilla has the appearance of having been broken off at its tip. Although the finrays of the anal and caudal are shown (correctly) as contiguous, the two fins are strongly demarcated by colour (anal grey/green, caudal orange/yellow). Scales and scutes are rather vaguely shown, and the drawing is far inferior to that given in the *Voyage of the Sulphur* (Richardson, 1844, pl. 54, fig. 1). The surviving Reeves specimen, of 10¼ inches, is too small to have been model for the Reeves illustration.

NOTE. This is the second of the two clupeoid species listed by Osbeck (1757), and reference is made to this early description in the synonymy since it was based on a Canton record and was used by Linnaeus (1758) in describing the species. Linnaeus

(1754) had originally named this fish *Mystus ensiformis*, giving a figure (fig. 12) which was later reproduced in the *Amoenitates Academiae* (1759). As in the case of *Mystus altus*, Linnaeus evidently decided to give priority to the name used by his pupil Osbeck during the latter's voyage in 1770, although that name did not appear in print until 1757.

The genus *Coilia* is badly in need of revision. It is not known, for example, to what extent small variations in numbers of pectoral filaments or gillrakers truly indicate specific differences. Authors have been divided on whether *C. grayii* is a distinct species or whether it is conspecific with *C. mystus*. Fowler (1931) distinguished the two on gillraker counts (*C. mystus* 22-25; *C. grayii* 28-30) and anal rays (70-86 and 86-92 respectively), but later (Fowler, 1941) he increased the range of anal rays in *C. mystus* to include *C. grayii*. Lönnberg (1896) identified a specimen at Uppsala (labelled *Clupea encrasicolus* Mus. Lin.) as the type of *C. mystus*, claiming that it was really one from the Lagerström collection which had been mislabelled. Lönnberg gave no gillraker count (if such a count is indeed possible), but on pectoral filament numbers placed *C. grayii* in the synonymy of *C. mystus* (7 free filaments); he distinguished *C. clupeoides* Lacepède (with 6 free filaments) as a separate species. It can be noted, however, that Lacepède (1803, pp. 466, 467) does not refer to filamentous pectoral rays and based his description on *Clupea mystus* of Linnaeus and Osbeck. The single specimen of *C. mystus* of Jordan & Seale (1926, p. 359) had 6 free pectoral rays and 24 gillrakers. Günther (1868) and Fowler (1941) list *C. clupeoides* as a synonym of *C. mystus*. The status of those species with only 6 pectoral filaments is discussed under the next species.

#### REDESCRIPTION OF TYPE AND REEVES SPECIMEN

TYPE: BMNH. 1855.9.19.1581; Reeves fish: BMNH. 1964.11.6.2.

Standard length: 243 mm. (TYPE); 238 mm. (Reeves)

Total length: 275 mm. (TYPE); 262 mm. (Reeves)

	mm.		%S.L.	
Body depth . . . . .	45.2	41.3	18.5	17.3
Head length . . . . .	44.2	40.2	18.1	16.9
Snout length . . . . .	9.6	9.1	3.7	3.8
Eye diam. . . . .	8.0	8.6	3.6	3.6
Upper jaw l. . . . .	54.3	51.1	21.9	21.5
Lower jaw l. . . . .	30.8	29.6	12.7	12.4
Pectoral l. . . . .	79.5	88.2	32.7	37.0
Pelvic l. . . . .	19.4	15.9	8.0	6.7
Pre-dorsal . . . . .	73.7	65.4	30.2	27.4
Pre-pelvic . . . . .	69.2	66.0	28.5	27.7
Pre-anal . . . . .	105.0	100.2	43.0	42.0

Body compressed, depth about equal to head length, posterior portion elongated, caudal peduncle about  $\frac{3}{4}$  eye at caudal base. Maxilla pointed posteriorly, reaching well beyond pectoral base, with fine conical teeth in a single series along entire lower edge becoming larger posteriorly; two supramaxillae. Fine teeth present on premaxillae, vomer, pterygoids, palatines and on dentaries, the latter with well-developed

coronoid process. Pseudobranch exposed, almost equal in length to eye diameter, filaments about twenty, short.

Dorsal (preceded by small spine) with iii 10 rays. Pectoral with vii 10 rays, the first seven filamentous and unbranched, reaching to about base of 10-14th branched anal ray, well beyond tip of depressed dorsal; branched rays of pectoral reaching beyond pelvic base. Pelvic i 6, its base below anterior dorsal rays and nearer to pectoral base than to anal origin. Anal iii 88 and iii 86, final rays joined to lower rays of caudal.

Scales caducous, no count possible. Abdominal scutes trenchant, 12 and 15 pre-pelvic, 24 and 24 post-pelvic, the latter with slender ascending arms, alternately long and short.

Gillrakers moderate, about eye diameter, strongly armed with serrae along inner edge; 22 and 22 rakers on upper arm of 1st arch, 30 and 27 on lower arm.

Branchiostegal rays 11.

15. "*Coilia playfairii* McClelland"  
= *Coilia playfairii* (McClelland)

*Choetomus playfairii* McClelland, 1844, *Calcutta J. nat. Hist.* 4: 405, pl. 24, fig. 3 (China on Playfair specimen(s)).

*Coilia playfairii*: Richardson, 1845, *Voy. Sulphur Ichth.*: 100, pl. 54, figs. 3-4 (Hong Kong, China seas); *Idem*, 1846, *Ichth. China Japan*: 309 (Japanese specimen).

*Coilia grayi* Kner, 1865, *Reise Novara, Fische*: 335 (Hong Kong).

*Coilia clupeioides*: Günther (*part.*), 1868, *Cat. Fish. Brit. Mus.* 7: 404 (Richardson specimen *ex* China).

*Coilia nasus*: Günther, 1868, *Cat. Fish. Brit. Mus.* 7: 405 (Japanese, Chinese specimens); Nichols, 1943, *Nat. Hist. Central Asia*, 9: 19 (Anhui, nr. Canton).

? *Coilia ectenes* Fowler, 1930, *Proc. Acad. nat. Sci. Philad.*: 601 (Hong Kong); *Idem*, 1931, *Hong Kong Nat.* 2 (3): 208 (Kong Hong specimens).

SPECIMENS. No Reeves specimens listed by Richardson and none in British Museum collections. There is, however, a Japanese specimen (173 mm. standard length, labelled "Adara Japan") which Richardson states was "labelled 'Adara' by the authors of the 'Fauna Japonica'". This fish was identified by Günther (1868, p. 406, specimen "a") as *C. nasus*. There is also a Chinese specimen (150 mm., BMNH. 1847.5.10.5) presented by Richardson which Günther (*loc. cit.*, p. 404) included under *Coilia clupeioides* Lacepède. The jar was later marked "*Coilia playfairii* TYPE". In fact this specimen may well be that on which the figure of *C. playfairii* in the "Voyage of the Sulphur" was based (pl. 54, fig. 3, stated to be natural size). However it is not a type. Finally, there is a Vachell fish of 268.5 mm. S.L. at Cambridge (Whitehead, in press).

FIGURE. Reeves No.  $\beta$ 26 shows a smaller fish than the figure for *C. grayii*, with a steeply rising dorsal profile (Pl. 5, fig. 3). The drawing is poor compared to that given in the "Voyage of the Sulphur". The number of pectoral filaments shown is 6.

NOTE. Several nominal species of *Coilia* are stated to have 6 (or 5-6) free filamentous pectoral rays. Excluding those with pearly spots along the flanks (light organs, see Haneda, 1961), or with few post-pelvic scutes (9-11), or a short maxilla not

reaching the gill opening, there are three species known from Chinese or Japanese waters (*C. playfairii*, *C. nasus* and *C. ectenes*). Jordan & Starks (1906) and Jordan & Herre (1906) distinguished *C. ectenes* Jordan & Seale from *C. nasus* Schlegel mainly because of its greater number of anal rays and abdominal scutes and its more elongate form. The Japanese specimen labelled "Adara" (see above) has a markedly elongate body compared with other Chinese or Japanese specimens examined, and it has 49 scutes (48-49 in *C. ectenes*: cf. 42-43 in *C. nasus*, according to Jordan & Starks, 1906), and 90 anal rays (96-113 in *C. ectenes*; cf. 80-82 in *C. nasus*). However, Boeseman (1947, p. 178) describes 46 scutes and 85-88 anal rays in the type material of *C. nasus*, while Richardson (1844) gives 42-47 scutes and 70-80 anal rays for *C. playfairii*.

Thus the meristic differences separating these three nominal species are slight, and further material may well show that only a single small species is present in Chinese and Japanese waters, viz. *C. playfairii*. Fowler (1941) placed all three in the synonymy of *C. mystus*, but the latter differs in pectoral count and, on the basis of the specimens in the British Museum, appears to be a larger species. As noted already, Jordan & Seale (1926) found 6 pectoral filaments and 24 gillrakers in the specimens they considered to be *C. mystus*; they record 7 filaments and 30 gillrakers in their specimens of *C. grayii*.

16. "*Thryssa mystax* Bl. Schn."

= *Thryssa mystax* (Schneider)

*Clupea mystax* Schneider, 1801, *Syst. Ichth. Bloch.*: 426, pl. 83 (Malabar).

*Thryssa mystax*: Richardson, 1846, *Ichth. China Japan*: 309 (on Reeves specimens).

*Engraulis mystax*: Fowler, 1930, *Proc. Acad. nat. Sci. Philad.*: 600 (Hong Kong).

*Setipinna mystax*: Fowler, 1931, *Hong Kong Nat.* 2 (3): 203 (Hong Kong specimens).

*Engraulis hamiltonii*: Günther, 1868, *Cat. Fish. Brit. Mus.* 7: 395 (Reeves and other Chinese specimens).

**SPECIMENS.** A fish, 183 mm. standard length (in alcohol) *ex* China presented by J. R. Reeves, with a metal tag sewn to caudal peduncle "R 138"; jar labelled "Clupea H 236 306 R 138", hitherto unregistered, but now BMNH. 1964.11.6.12. There is also a mounted skin (left side), labelled "*Engraulis hamiltonii* China J. R. Reeves, Esq." and with the Hardwicke and Reeves illustration numbers pencilled on the wooden base; hitherto unregistered, now BMNH. 1964.11.6.13. Both specimens are mentioned by Richardson.

**FIGURE.** Reeves No. 138 might well have been drawn from the dry specimen in this museum, being only slightly larger than the illustration. It shows a rather deep-bodied compressed engraulid with post-pelvic scutes, a maxilla reaching beyond the posterior margin of the operculum, a long anal fin and no filamentous pectoral rays (Pl. 6, fig. 1). The black venulose supra-scapular area seen in the specimens is clearly shown in the illustration<sup>1</sup>, and the position of the fins closely correspond with those in the dried specimen. Richardson notes "an indistinct stripe along the middle of the anal", but this does not appear in the preserved material.

<sup>1</sup> Referred to as "hairy process behind gills" in the Chinese *Chrestomathy* under species No. 4 (Bridgman 1841, p. 486).

NOTE. Fowler (1931) recorded both *T. hamiltonii* and *T. mystax* from Hong Kong. *T. hamiltonii* is distinguished from *T. mystax* by its shorter maxilla (to gill opening or just beyond; cf. to or beyond pectoral base in *T. mystax*). It is suspicious, however, that the specimens of *T. hamiltonii* in our collections are mostly large fishes, whereas those of *T. mystax* are small. Amongst the smaller specimens labelled *T. hamiltonii* (100 mm. and below), the maxilla reaches almost to the pectoral base. In all other respect these two nominal species are similar and their meristic counts overlap. The genus is currently under revision by Dr. S. Dutt.

The name *Thrissocles* Jordan & Evermann, widely but wrongly used for this genus as a senior synonym, should be replaced by *Thryssa* Cuvier, 1829 (see Whitehead, 1965*b*). Fowler (1931, p. 203) placed both *T. mystax* and *T. hamiltonii* in *Setipinna* Swainson, although he had (correctly) characterized that genus as possessing a filamentous upper pectoral ray.

## DESCRIPTION OF REEVES SPECIMENS

Standard lengths: 183 mm. BMNH. 1964.11.6.12 (alcohol)  
188 mm. BMNH. 1964.11.6.13 (skin)

(Figures for the alcohol specimen are given first.)

	mm.		% S.L.	
Body depth . . . . .	46.4	51.2	25.3	27.3
Head length . . . . .	40.1	41.7	22.0	22.3
Snout length . . . . .	5.8	7.2	3.2	3.8
Eye diam. . . . .	8.6	8.6	4.7	4.6
Upper jaw length . . . . .	41.5	41.7	22.7	22.3
Lower jaw length . . . . .	30.5	29.5	16.7	15.7
Pectoral l. . . . .	32.2	—	17.6	—
Pelvic l. . . . .	13.8	—	7.5	—
Anal base l. . . . .	54.1	63.8	29.6	33.8
Pre-dorsal . . . . .	95.4	102.9	52.2	54.5
Pre-pectoral . . . . .	43.9	—	24.0	—
Pre-pelvic . . . . .	75.4	—	41.5	—
Pre-anal . . . . .	115.9	122.5	63.5	65.5

Body compressed, its width almost three times in its depth. Maxilla long, reaching beyond posterior border of operculum to a point half way between operculum border and base of first pectoral ray. Pectoral fins just reaching base of pelvics, the tips of the latter just before dorsal origin. The following counts apply to the alcohol specimen only.

Dorsal with iii 11 rays, preceded by a minute spine, its origin equidistant between caudal base and anterior half of eye. Pectoral i 10; pelvic i 6. Anal with iii 37 rays, its origin slightly behind last dorsal ray.

Abdominal scutes keeled, with sharp spines, 18 pre-pelvic (first minute), 11 post-pelvic (Richardson, 13 + 9).

Gillrakers 9 + 14 on first arch, each raker bearing serrae of approximately even length, not ranged into clumps.

Scale counts not possible (Richardson, 38).

Venulose supra-scapular area with the venules dotted with small, linearly arranged melanophores. Flanks silver, except for upper  $\frac{1}{6}$  which is brown. All fins hyaline.

17. "*Megalops setipinnis* Forster"

= *Megalops cyprinoides* (Broussonet)

*Clupea cyprinoides* Broussonet, 1782, *Tableau Ichth.*: no pagination, pl. 9 (Oceans between the tropics).

*Megalops setipinnis* Richardson, 1843, *Ann. Mag. nat. Hist.* 11: 493 (Port Essington); *Idem*, 1846, *Ichth. China Japan*: 310 (Seas of China).

*Megalops curtifilis* Richardson, 1846, *Ichth. China Japan*: 310 (on Reeves illustrations, Chinese Seas).

TYPE. A skin (right side), 180 mm. standard length, labelled "Fresh water swamp near Victoria, Port Essington" and on the reverse side "Sept. 20. 1840. 3.". A second label, pasted on the inside of the specimen, reads "3. *Megalops setipinna* Forster." This is the smaller of two skins, the other of which is registered BMNH. 1853.1.4.20; both are listed by Günther (1868, p. 472, d-e).

Richardson (1842 and subsequent papers on Australian fishes) described some dried skins numbered 1-37, presented to this museum by J. Gould and collected in the Port Essington area by Gould's assistant, Gilbert. In the original description of *M. setipinnis*, Richardson (1843, p. 493) describes a single Gilbert specimen of 9 inches 2 lines total length, "No. 3, Mr. Gilbert's list". The smaller of the two British Museum skins, although now with damaged caudal tips, corresponds with the measurements given by Richardson. This fish is certainly the holotype of *M. setipinnis* Richardson, 1843, and it is now registered BMNH. 1964.11.6.14.

SPECIMENS. Richardson states that he had seen no Chinese (or Indian) specimens, and there are no Reeves specimens in the British Museum. There are two alcohol specimens from Port Essington (BMNH. 1843.8.10.11 and 1855.9.19.1142-3). The first of these was presented by Gould and was no doubt one of those referred to by Richardson in the "Report".

FIGURE. Reeves No. 96 is a fair illustration (Pl. 6, fig. 2), showing well the anastomosing canals on the lateral line pore scales. There is, however, a single canine shown in the upper jaw; Richardson remarks on this anomaly.

NOTES. Richardson based his name for this species on a pencilled title "*Clupea setipinna*" written underneath the uncoloured and only partly finished drawing by J. G. Forster (No. 242 in Forster's drawings from Cook's 2nd voyage, 1772-75, the 2nd of two volumes in the Zoological Library of the British Museum (Natural History)). Since Forster's drawings were unpublished, Richardson was wrong to place *Clupea cyprinoides* Broussonet, 1782 as a junior synonym of this species.

Amongst the drawings, figures, etc. belonging to Richardson and left to this museum by his son, there is a tracing of Forster's "Kundinga" with a pencilled note underneath "not Gilbert's fish". In his description of *M. setipinnis* Richardson notes that the Reeves drawing corresponds "exactly in profile and size of fins, shape of head, etc." with the figures of both Forster and Broussonet, but that Forster's colours are different.

18. "*Megalops curtifilis* Richardson"  
 = *Megalops cyprinoides* (Broussonet)

(See previous species for synonymy.)

SPECIMEN. No specimens mentioned by Richardson, and none in British Museum.

FIGURE. Reeves No. 136 shows a smaller fish than in No. 96, but clearly referable to *Megalops cyprinoides* (Pl. 6, fig. 3). The dorsal filament is a little shorter and the upper jaw a little longer than in No. 96, but the pored lateral line scales with their radiating canals are well shown.

NOTE. This is evidently *M. cyprinoides*, the differences found by Richardson being attributable to poor drawing (scales fewer) and the fact that it was most likely a juvenile (dorsal filament shorter, body more slender).

19. "*Elops machnata* Forskål"  
 = *Elops machnata* (Forsskål)

*Argentina machnata* Forsskål, 1775, *Descriptiones Animal.* : 13, 68 (Red Sea).

*Elops machnata* : Richardson, 1846, *Ichth. China Japan* : 311 (Canton, Seas of China).

*Elops purpurescens* Richardson, 1846, *Ichth. China Japan* : 311 (Chinese Seas).

*Elops saurus* : Günther, (part), 1868, *Cat. Fish. Brit. Mus.* 7: 470 (Reeves specimen, Indo-Pacific material).

SPECIMEN. Richardson states that Reeves deposited a specimen from Canton in this museum. Amongst the stuffed specimens is one, of 390 mm. standard length, originally labelled "*Elops saurus*" but with the name "*machnata*" added in another hand. Unlike the other stuffed Reeves specimens, no details are painted on the wooden base, but a pencilled note underneath reads "*Elops machnata* Canton J. R. Reeves Esq.". The specimen was hitherto unregistered but is now BMNH. 1964. II.6.3.

FIGURE. Reeves No. 137 is a fair drawing and easily recognizable as *Elops* by its small scales, elongate body, pored lateral line scales, etc. (Pl. 7, fig. 1).

NOTES. The specimen has approximately 87 pored lateral line scales, which accords with *E. machnata*, and the lower jaw (now set open) probably covered the pre-maxillary tooth band when the jaw was closed (lower jaw included in *E. hawaiiensis* Regan). On the basis of the most recent key (Whitehead, 1962*b*) the specimen is evidently *E. machnata*. Richardson rightly distinguished his fish from the *Mugil salmoneus* (Forster) Schneider figured in his Ichthyology of the Erebus and Terror (Richardson, 1896, pl. 36, figs. 1, 2); that fish was *Chanos chanos* (Forsskål), a species apparently not encountered by Reeves.

20. "*Elops purpurescens* Richardson"  
 = *Elops machnata* (Forsskål)

(See previous species for synonymy.)

TYPE. Richardson based this name solely on the Reeves illustration. The name is now a *nomen oblitum* but it is very unlikely that a distinct Chinese or Western Pacific species or subspecies of *Elops* will ever be recognized.

FIGURE. Reeves No. 53 appears to have been drawn from a specimen long out of water (Pl. 7, Fig. 2). The fins have darkened, the flanks are paler and the back is darker than in the figure of *E. machnata*. In addition, the body is twisted, giving a more convex lower profile than in the preceding species.

NOTE. Richardson distinguished this fish from *E. machnata*, but added "This drawing does not differ very greatly from the preceding one in form". He notes its more irregular and less arched dorsal outline, more convex belly and slightly decurved lateral line. He also notes a slight difference in the Chinese names given by Reeves: *Chuh Keaou*, "Bamboo—" for *E. machnata*; *Chuh Kin*, "variegated Bamboo" for *E. purpureus*.

The figure suggests merely a twisted specimen of *E. machnata*. Only a single species of *Elops* is recognized from the Western Pacific (see Whitehead, 1962b).

21. "*Chirocentrus dorab* Forskål"  
= *Chirocentrus dorab* (Forsskål)

*Clupea dorab* Forsskål, 1775, *Descriptiones Animal.*: 72 (Red Sea).

*Chirocentrus dorab*: Richardson, 1846, *Ichth. China Japan*: (Canton, seas of China); Günther, 1868, *Cat. Fish. Brit. Mus.* 7: 475 (Reeves specimen); Fowler, 1930, *Proc. Acad. nat. Sci. Philad.*: 598 (Hong Kong); *Idem*, 1931, *Hong Kong Nat.* 2 (1): 75 (Hong Kong specimens); Herre, 1931, *Hong Kong Nat. Supplement*, No 3: 26 (2 Hong Kong specimens).

SPECIMEN. Richardson mentions an alcohol specimen from Canton presented by Reeves of 10¼ inches. This specimen (220 mm. S.L.; hitherto unregistered, but now BMNH. 1964.11.6.1) is labelled "*Chirocentrus dorab* China J. R. Reeves Esq. H 237 R". It lacks scales and the fins are damaged slightly, but otherwise the specimen is in fair condition.

FIGURE. As Richardson noted, the Reeves figure (Reeves No. 47) hints at pungent ventral scutes (Pl. 7, fig. 3), but these spines are in fact the tips of the ribs, a common artifact in preserved specimens of *Chirocentrus*. The figure shows no scales, but it is not possible to judge whether the present specimen (10¼ inches) served as model for the illustration (15 inches).

NOTES. This specimen has 5 + 16 gillrakers on the first arch, a count which places it in *C. hypselosoma* Bleeker according to Hardenberg (1930) (modal count 14-15 on lower part of first arch for *C. dorab*). On the other hand, the body depth is contained 6 times in standard length in the Reeves specimen and the maxilla does not reach the front border of the preoperculum, which accords with *C. dorab* (5½ and beyond respectively in *C. hypselosoma*). The systematic position of Bleeker's *C. hypselosoma* has been examined elsewhere (Whitehead, Boeseman & Wheeler, in press) and the conclusion reached that there may indeed be two species of *Chirocentrus* present in the Indo-Pacific. However, for the present, the Reeves fish is identified with *C. dorab* until the two species can be more trenchantly defined.

LIST OF HONG KONG ELOPOID AND CLUPEOID SPECIES

For a list of the elopoid and clupeoid species recorded from the Hong Kong area (see Table 2) I have relied chiefly on Fowler (1930, 1931), Herre & Myers (1931)



and Herre (1934). There have been few subsequent records. In addition to published records, the list of species given has been augmented by inclusion of specimens represented in the British Museum collections, and especially by Hong Kong specimens generously donated to the museum by Mr. W. Chan.

Hong Kong lies just within the tropics, and many of the species found there are common both to the Philippines and to the sea around Taiwan (Formosa). Where species have been reported from near Taiwan (Chen, 1961, and a useful review of clupeoids by Chu & Tsai, 1958), or from Korea (Mori, 1952), or from Japan (Matsubara, 1955), and at the same time are also known from the Philippines (Fowler, 1941; Herre, 1953), then I have assumed their probable occurrence in Hong Kong waters. Such an assumption is usually justified in clupeoid fishes, the marine species, at least in the Indo-Pacific region, being for the most part wide-ranging.

Forty-four species are listed here, more than twice as many as were known to Richardson. However, in eleven cases there is no actual Hong Kong record or specimen, and the list for certain genera can only be tentative. This is particularly true for the genera *Herklotsichthys* and *Sardinella*. The species of *Stolephorus* of this area are also poorly known, but the Chan collection contained three species and showed, perhaps surprisingly, that one of the commonest is *S. buccaneeri* Strasburg, a species closely related to *S. purpureus* Fowler, both of which were believed confined to the Hawaiian Islands. The presence of *S. buccaneeri* in the Hong Kong region may explain the reports of *S. zollingeri* (Bleeker) from Japanese waters (Hayashi & Tadokoro, 1962). Thus the types of *S. zollingeri* are not members of *Stolephorus* at all, but are *Engraulis japonicus* Schlegel (Whitehead, 1964b), a species unlikely to be misidentified by Japanese workers. But published descriptions of *S. zollingeri* in Japanese waters (e.g. Hayashi & Tadokoro, loc. cit.) strongly suggest *S. buccaneeri*, although none have mentioned the characteristic diamond-shaped urohyal plate (see Whitehead, 1965b, fig. 4a). Specimens of *S. buccaneeri* have also been recorded from the Red Sea region and from Durban (Whitehead, 1965b) but not from intervening areas.

The list of species of *Thryssa*, *Coilia* and *Ilisha* given here must also be considered tentative, all three genera badly needing revision.

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The manuscript was read by Dr. P. H. Greenwood and I gratefully acknowledge his useful comments and criticisms.

TABLE 2

Elopoid and clupeoid species recorded from the vicinity of Hong Kong.

Species	Reference
<b>ELOPIDAE</b>	
<i>Elops machnata</i> (Forssk.)	Richardson, 1846 (Canton*).
<b>MEGALOPIDAE</b>	
<i>Megalops cyprinoides</i> (Brouss.)	Richardson, 1846 (on Reeves Illustr.)
<b>ALBULIDAE</b>	
† <i>Albula vulpes</i> (Linn.)	[Fowler, 1941—Japan, East Indies; Liu & Shen, 1957—Taiwan.]
<b>CHIROCENTRIDAE</b>	
<i>Chirocentrus dorab</i> (Forssk.)	Richardson, 1846 (Canton*); Fowler, 1930, 1931, (Hong Kong).
<b>DUSSUMIERIIDAE</b>	
<i>Etrumeus teres</i> (DeKay)	Whitehead, 1963b, p. 374 (Hong Kong); Hong Kong*
<i>Dussumieria acuta</i> Valenciennes	Herre & Myers, 1931 (Hong Kong); Hong Kong.*
<i>Spratelloides gracilis</i> (Schlegel)	[Whitehead, 1963a, p. 375—Formosa*; Fowler, 1941—Philippines]; Hong Kong.*
<b>CLUPEIDAE</b>	
(Clupeinae)	
<i>Sardinella aurita</i> Valenciennes	Richardson, 1846 (on Reeves illustr. of <i>C. nymphaea</i> ); [Kishinouye, 1907—Amoy, Swatow; Chan, 1965—Taiwan]; China*.
† <i>Sardinella brachysoma</i> Blkr.	[Chu & Tsai, 1958—Formosa, as <i>S. albella</i> (Val.).]
† <i>Sardinella bulan</i> (Bleeker)	[Bleeker, 1873—Amoy]; Amoy*.
<i>Sardinella jussieu</i> (Lac.)	Fowler, 1931 (Hong Kong); Amoy*, Hong Kong*.
<i>Sardinella fimbriata</i> (Valenc.)	Richardson, 1846—as <i>C. isingleena</i> ; Hong Kong*.
<i>Sardinella leiogaster</i> Valenciennes	Kner, 1865 (Hong Kong); Richardson, 1846—as <i>C. caeruleo-vittata</i> ; ? Jouan, 1867—Hong Kong, as <i>Harengula moluccensis</i> .
† <i>Sardinella clupeoides</i> (Blkr.)	[Kishinouye, 1907—Japan, as <i>C. okinawensis</i> ; Fowler, 1941—Philippines; Chan, 1965—Thailand, Philippines].
† <i>Herklotsichthys schrammi</i> (Bleeker)	[Chu & Tsai, 1958—Formosa].
† <i>Herklotsichthys punctatus</i> (Rüppell)	[Chu & Tsai, 1958—Formosa]; Philippines*.
† <i>Herklotsichthys zunasi</i> (Bleeker)	[Fowler, 1951—Japan, Philippines]; Japan*, East Indies*.
(Alosinae)	
<i>Hilsa (Tenualosa) reevesii</i> (Richardson)	Richardson, 1846; Whitehead, 1965a (Hong Kong*).
<i>Hilsa (Tenualosa) toli</i> (Valenc.)	Fowler, 1931 (Hong Kong, as <i>Macrura sinensis</i> ); [Jordan & Evermann, 1902—Formosa].
(Pristigasterinae)	
† <i>Pellona ditchela</i> Valenciennes	[Liu & Shen, 1957—Taiwan, as <i>Ilisha hoeveni</i> ].

\* Specimen in British Museum from this locality. [ ] references from other areas.

† Species may occur in Hong Kong waters, but no record or specimen.

- Ilisha elongata* (Bennett) Richardson, 1846 (China Seas\*); Valenciennes, 1847 (Macao); Kner, 1865 (Hong Kong); Fowler, 1931 (Hong Kong); Chen, 1961 (Quemoy); Amoy\*.
- Ilisha brachysoma* (Bleeker) Fowler, 1931 (Hong Kong); Hong Kong\*.
- Ilisha indica* (Swainson) Norman, 1923 (Hong Kong\*); [Chen, 1961—Quemoy].
- Ilisha novacula* (Valenc.) Norman, 1923 (China\*).
- Opisthopterus tardoore* (Cuvier) Fowler, 1931 (Hong Kong).
- Opisthopterus valenciennesi* Blkr. Foochow\*, Hong Kong\*.
- (Dorosomatinae)
- Konosirus punctatus* (Schlegel) Richardson, 1846 (Chinese sea\*); Herre & Myers, 1931 (Hong Kong); Amoy\*.
- Clupanodon thrissa* (Linn.) Osbeck, 1757 (Canton); Richardson, 1846 (on Reeves illustr. and specimen from Canton\*); Fowler, 1930, 1931 (Hong Kong); Herre, 1934 (Hong Kong); [Liu & Shen, 1957—Taiwan].
- Nematalosa nasus* (Bloch) ? Richardson, 1846 (on Reeves illustr.); Jordan & Seale, 1905 (Hong Kong); Herre, 1934 (Hong Kong); Hong Kong\*.
- Nematalosa japonica* Regan Herre & Myers, 1931 (Hong Kong); Hong Kong\*.
- †*Anodontostoma chacunda* (Ham. Buch.) [Fowler, 1941—Hainan, Philippines].
- ENGRAULIDAE
- Engraulis japonicus* (Schlegel) Chefoo\*, Hong Kong\* [Whitehead, 1964—Japan\*, East Indies].
- Stolephorus commersonii* Lac. Richardson, 1846 (China\*); Fowler, 1930 (Hong Kong); Hong Kong\*.
- Stolephorus indicus* (van Hass.) Seale, 1914 (Hong Kong); Herre & Myers, 1931 (Hong Kong); [Chen, 1961—Quemoy]; Hong Kong specimens, Zool. Mus. Copenhagen.
- Stolephorus buccaneeri* Strasburg Formosa\*; [? Chen, 1961, as *S. zollingeri*—Quemoy]; Hong Kong\*.
- Stolephorus tri* (Bleeker) [Bleeker, 1865—Amoy; ]Liu & Shen, 1957—Taiwan]; Hong Kong\*.
- Stolephorus heterolobus* (Rüpp.) Hong Kong\*; [Liu & Shen, 1957—Taiwan, as *S. pseudoheterolobus*].
- Thryssa mystax* (Schneider) Osbeck, 1757 (Canton); Richardson 1844–5, 1846 (China Seas); Jordan & Seale, 1926 (Hong Kong); Herre & Myers, 1931 (Hong Kong); Herre 1934 (Hong Kong). [Fowler, 1941—Philippines]; Amoy\*.
- †*Thryssa setirostris* (Brouss.) Seale, 1914 (Hong Kong); [Chen, 1961—Quemoy].
- Thryssa dussumieri* (Valenc.)
- †*Thryssa hamiltonii* (Gray) [Mori, 1952—Japan; Fowler, 1931—Philippines]; China\*.
- Setipinna taty* (Valenc.) Fowler, 1931 (Hong Kong).
- Coilia mystus* (Linn.) Osbeck, 1757 (Canton); Richardson, 1844–5, 1846 (China Seas\*); Jordan & Seale, 1926 (Hong Kong).
- Coilia playfairii* (McClelland) Richardson, 1845 (Hong Kong); Kner, 1865 (Hong Kong); Fowler, 1930, 1931 (Hong Kong); Nichols, 1943 (Anhwei, nr. Canton); China\*.

## REFERENCES

- ANON. 1904. *The history of the collections contained in the Natural History Departments of the British Museum*. 1. Trustees British Museum, London: 442 pp.
- BERTIN, L. 1944. Mise au point sur quelques espèces de clupéidés. *Bull. Soc. zool. France*, **66**: 18-25.
- BLEEKER, P. 1865. Notice sur les poissons envoyés de Chine au Musée de Leide par M. G. Schlegel. *Ned. Tijdschr. Dierk.* **2**: 55-62.
- 1873. Memoire sur la faune ichthyologique de Chine. *Ibid.* **4**: 113-154.
- BOESEMAN, M. 1947. *Revision of the fishes collected by Burger and von Siebold in Japan*. E. J. Brill, Leiden: 242 pp.
- BRIDGMAN, E. C. 1841. *Chinese Chrestomathy in the Canton dialect*. S. W. Williams, Macao: 698 pp.
- CHAN, W. L. 1965. A systematic revision of the Indo-Pacific clupeoid fishes of the genus *Sardinella* (Family Clupeidae). *Jap. J. Ichthyol.* **12**: 104-157; *ibid.* **13**: 1-39.
- CHEN, T-R. 1961. Contributions to the fishes from Quemoy (Kinmen). *Quart. J. Taiwan Mus.* **13** (3-4): 191-213.
- CHU, K-Y. & TSAI, C-T. 1958. A review of the clupeoid fishes of Taiwan, with descriptions of new species. *Ibid.* **11** (1-2): 103-125.
- FORSTER, J. R. 1771. *A voyage to China and the East Indies, by Peter Osbeck* [translated from the German edition of 1765], London, 2 vols.
- FOWLER, H. W. 1930. Notes on Japanese and Chinese fishes. *Proc. Acad. nat. Sci. Philad.* **81**: 589-616.
- 1931. A synopsis of the fishes of China, pt. 2. *Hong Kong Nat.* **2** (1): 69-79; *idem*, **2** (2): 111-123; *idem*, **2** (2): 198-208.
- 1941. Contributions to the biology of the Philippine Archipelago and adjacent regions. *Bull. U.S. nat. Mus.* **13** (100): 1-879.
- GRAY, J. E. 1851. *List of the specimens of fish in the collection of the British Museum*. Part I. Chondropterygii. Trustees Brit. Mus., 160 pp.
- GÜNTHER, A. K. L. G. 1868. *Catalogue of the fishes in the British Museum*, **7**: 373-512.
- 1874. Third notice of a collection of fishes made by Mr. Swinhoe in China. *Ann. Mag. nat. Hist.* (4) **13**: 154-159.
- 1880. *Report on the shore fishes procured during the voyage of H.M.S. Challenger in the years 1873-76*, **1**: 1-82.
- HANEDA, Y. 1961. A preliminary report on two luminous fish from Bombay and Hong Kong. *Sci. Rept. Yokosuka City Mus.* **6**: 45-50.
- HAYASHI, S. & TADOKORO, A. 1962. The occurrence of the taiwan-ainoko, *Stolephorus zollingeri* (Bleeker) in Japan. *Bull. Jap. Soc. Sci. Fish.* **28** (1): 26-29.
- HARDENBERG, J. D. F. 1930. Some remarks on the genus *Chirocentrus*. *Treubia*, **12** (1): 51-65.
- HERRE, A. W. 1934. Hong Kong fishes collected in October-December, 1931. *Hong Kong Nat. Supplement*, No. 3: 26-36.
- 1953. *Check list of Philippine fishes*. Research Report 20, U.S. Fish & Wildlife Service, Washington: 977 pp.
- HERRE, A. W. & MYERS, G. S. 1931. Fishes from south-eastern China and Hainan. *Lingnan Sci. J.* **10** (2-3): 233-254.
- HOUTTUYS, M. 1782. Beschryving van eenige Japanese visschen en andere Zee-Schepzelen. *Verh. Holland. Maatsch. Haarlem*, **20**: 340-341.
- JORDAN, D. S. & EVERMANN, B. W. 1902. Notes on a collection of fishes from the island of Formosa. *Proc. U.S. nat. Mus.* **25**: 315-368.
- JORDAN, D. S. & SEALE, A. 1905. List of fishes collected in 1882-83 by Pierre Louis Jouy at Shanghai and Hong Kong, China. *Ibid.* **29**: 517-529.
- 1926. Review of the Engraulidae, with descriptions of new and rare species. *Bull. Mus. Comp. Zool.* **67** (11): 355-418.

- JORDAN, D. S. & HERRE, A. C. 1906. Review of the herring-like fishes of Japan. *Proc. U.S. nat. Mus.* **31** : 613-645.
- JORDAN, D. S. & STARKS, E. C. 1906. Notes on a collection of fishes from Port Arthur, Manchuria, obtained by James Francis Abbott. *Ibid.* **31** : 515-526.
- JOUAN, H. 1867. Notes sur quelques poissons de mer observés à Hong Kong. *Mém. Soc. Imp. Sci. nat., Cherbourg*, **13** (2 ser) (3) : 241-282.
- KISHINOUE, K. 1907. Notes on the natural history of the sardine. *J. Imp. Fish. Bureau*, **14** (3) : 71-105.
- KNER, R. 1865. *Reise der Oesterreichischen Fregatte Novara um die Erde, in . . . 1857-59. Fische.* Wien : 433 pp.
- LACEPÈDE, 1803. *Histoire naturelle des poissons*, **5**. Paris, i-lxviii, 803 pp.
- LIANG, Y-S. 1948. Notes on a collection of fishes from the Pescadores Islands, Taiwan. *Quart. J. Taiwan Mus.* **1** (2) : 1-20.
- LINNAEUS, K. 1754. *Chinensia Lagerströmiana (dissertatio Amoen. Acad.)* : 1-36.
- 1758. *Systema Naturae*, ed. 10 : 1-824.
- 1759. *Chinensia Lagerströmiana. Amoenitates Academiae*, **4** (61) : 230-260.
- LIU, F. H. & SHEN, S. C. 1957. A preliminary report on the activity of Wen-fishes (Herring-like fishes) along the coast of Taiwan. *Rept. Fish. Biol. Nat. Taiwan Mus.* **1** (2) : 24-32.
- LÖNNBERG, E. 1896. Linnaean type-specimens of birds, reptiles, batrachians and fishes in the Zoological Museum of the University in Uppsala. *Bihang K. Svenska Vet.-Akad. Handlingar.* **22** (4) : 3-45.
- MATSUBARA, K. 1955. *Fish morphology and hierachy.* Pt. I. Ishizaki, Tokyo : 605 pp.
- MORI, T. 1952. Check list of the fishes of Korea. *Mem. Hyogo Univ. Agric.* **1** (3) : 1-228.
- NICHOLS, T. 1943. The freshwater fishes of China. *Nat. Hist. Central Asia*, **9** : 1-322.
- NORMAN, J. R. 1923. A revision of the clupeid fishes of the genus *Ilisha* and allied genera. *Ann. Mag. nat. Hist.* (9) **11** : 1-22.
- OSBECK, P. 1757. *Dagbok öfver en Ostindisk Resa aren 1750-52.* Stockholm : 376 pp.
- REGAN, C. T. 1917a. A revision of the clupeid fishes of the genera *Pomolobus*, *Brevoortia* and *Dorosoma*, and their allies. *Ann. Mag. nat. Hist.* (8) **19** : 297-316.
- 1917b. A revision of the clupeid fishes of the genera *Sardinella*, *Harengula*, etc. *Ibid.* (8) **19** : 377-395.
- RICHARDSON, J. 1842. Contributions to the ichthyology of Australia, 1. *Ibid.* (1) **9** : 15-31.
- 1843. Contributions to the ichthyology of Australia, 63. *Ibid.* (1) **11** : 489-498.
- 1844-45. *The zoology of the voyage of the Sulphur*, **1** : *Ichthyology*. Smith, Elder & Co., London : 53-150 (see *Rept. Ichth. China Japan*, p. 316 for dating of three "Sulphur" fasciculi).
- 1845-46. *The zoology of the voyage of H.M.S. Erebus & Terror : Ichthyology.* E. W. Jansen, London : (see *Rept. Ichth. China Japan*, p. 272 for clue to dating).
- 1846. *Report on the ichthyology of the seas of China and Japan* (from *Rept. Brit. Ass. Adv. Sci.*, 1845). Richard & John E. Taylor, London : 187-320.
- RUSSELL, P. 1803. *Description and figures of two-hundred fishes collected at Vizagapatam on the coast of Coromandal.* W. Bulmer & Co., London, **2** : 1-85.
- SEALE, A. 1914. Fishes of Hong Kong. *Philipp. J. Sci.* **9** (1) Sect. D. : 59-79.
- SHIPLEY, A. E. 1913. "J" *A Memoir of John Willis Clark.* Smith, Elder, London.
- VALENCIENNES, M. A. 1847. *Histoire Naturelle des Poissons*, Paris, **20** : 1-472.
- 1848. *Ibid.* **21** : 1-536.
- WHITEHEAD, P. J. P. 1962a. A review of the Indo-Pacific gizzard shad genera *Nematalosa*, *Clupanodon* and *Konosirus*. *Bull. Brit. Mus. nat. Hist. (Zool.)* **9** (2) : 87-102.
- 1962b. The species of *Elops*. *Ann. Mag. nat. Hist.* (13) **5** : 321-329.
- 1963a. A revision of the recent round herrings (Pisces : Dussumieriidae). *Bull. Brit. Mus. nat. Hist. (Zool.)* **10** (6) : 305-380.
- 1963b. *Atherina japonica* Houttuyn, 1782 : proposed suppression as being a *nomen dubium*. *Bull. zool. Nomencl.* **20** (4) : 281-284.

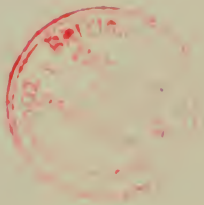
- WHITEHEAD, P. J. P. 1964a. *Herklotsichthys* Whitley, 1951 to replace *Harengula* Valenciennes, 1847 for Indo-Pacific species (Pisces : Clupeidae). *Ann. Mag. nat. Hist.* (13) **6** : 273-284.
- 1964b. New data extending the range of the bipolar antitropical anchovy genus *Engraulis*. (in Russian). *Zool. Zh.* **43** (6) : 879-888.
- 1964c. A redescription of the holotype of *Clupalosa bulan* Bleeker, and notes on the genera *Herklotsichthys*, *Sardinella* and *Escualosa* (Pisces : Clupeidae). *Ann. Mag. nat. Hist.* (13) : 273-284.
- 1965a. A preliminary revision of the Indo-Pacific Alosinae (Pisces : Clupeidae). *Bull. Brit. Mus. nat. Hist. (Zool)* **12** (4) : 117-156.
- 1965b. A review of the elopoid and clupeoid fishes of the Red Sea region. *Ibid.* **12** (7) : 225-281.
- (in press). The Vachell collection of Chinese fishes at Cambridge.
- WHITEHEAD, P. J. P., BOESEMAN, M. & WHEELER, A. C. (in press). The types of Bleeker's Indo-Pacific elopoid and clupeoid fishes. *Zool. Verhandl. Leiden*.

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THE ELOPOID AND CLUPEOID FISHES IN  
RICHARDSON'S "ICHTHYOLOGY OF THE SEAS  
OF CHINA AND JAPAN" 1846

BY

P. J. P. WHITEHEAD

British Museum (Natural History)



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By P. J. P. WHITEHEAD

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## ABSTRACT

THE twenty-one elopoid and clupeoid fishes included by Richardson in his *Report on the Ichthyology of the Seas of China and Japan* are critically examined in the light of the specimens and the hitherto unpublished Reeves illustrations in the British Museum (Natural History). Sixteen of these species are considered valid, and the type status of certain of the specimens is established. A list is given of thirty-four elopoid and clupeoid species recorded from the Hong Kong area, and ten further species likely to occur there.

## INTRODUCTION

While studying certain herring and anchovy species, it became necessary to examine those species included by Richardson in his *Report on the Ichthyology of the Seas of China and Japan*, published in 1846. Since Richardson's "Report" was based partly on specimens in the British Museum (Natural History) and partly on a collection of coloured illustrations compiled by John Reeves, also now in the British Museum (Natural History), the opportunity was taken to make a critical assessment of all twenty-one of the elopoid and clupeoid species reported by Richardson. The results have shown that a similar study of other groups would clear up many of the doubts and errors which have surrounded some of Richardson's species.

Over three hundred of the species listed by Richardson in the "Report" were represented by a Reeves illustration based on specimens from the markets at Macao and Canton. The Reeves illustrations are thus an important, sometimes decisive, factor in the identification of certain of Richardson's species. Unfortunately, the illustrations have never been published and ichthyologists have not always had the opportunity for consulting them. The twenty drawings covered by the present work are therefore reproduced here.

A full list of the herring-like fishes in the Hong Kong area has not yet been published. Since identification of the Richardson fishes has entailed an assessment of all Hong Kong-Canton records, I have compiled a tentative list of forty-four species for this area (Table 2). Richardson mentioned twenty-one species but four of these are here considered synonyms, and one cannot be identified (Table 1).

## RICHARDSON'S "REPORT"

For various historical reasons, knowledge of the fishes of the seas of China and Japan lagged far behind that of European waters by the beginning of the nineteenth century. In the *Chinensia Lagerströmiana*, Linnaeus (1754) listed only 12 species of fish from China. In 1750, Pieter Osbeck, chaplain to a Swedish East Indiaman and a pupil of Linnaeus, examined fishes in the vicinity of Canton and he mentioned 9 species (Osbeck, 1757). Forster (1771), in an English translation of Osbeck's "Dagbok", added a further 9 species given by Linnaeus in the *Systema Naturae* (or in the *Amoenitates Academicæ*), to make a total of only 18 Chinese species described in the Linnaean method at that time. Boeseman (1947) has pointed to the equally sparse knowledge of Japanese fishes during the eighteenth century and in fact up until the publication of the ichthyological volumes of the *Fauna Japonica* in 1842-50.

Richardson's "Report" was one of a number of important ichthyological works which appeared at the middle of the nineteenth century. The works of Bleeker, Temminck & Schlegel, Günther, and Cuvier & Valenciennes, all dealing (in part at least) with fishes from the western Pacific, appeared at this time. The "Report" was published in the same year as that part of the *Fauna Japonica* dealing with clupeoid fishes, and it pre-dates the clupeoid volumes of Cuvier & Valenciennes (vols. 20 and 21) and also Günther (vol. 7), as well as most of Bleeker's papers. Unfortunately, due to curatorial errors and the fact that the Reeves illustrations were never published, some of Richardson's species have been ignored for so long that they are now *nomina oblita*.

Richardson based the "Report" chiefly on the coloured illustrations of John Reeves (1774-1856), supplemented by specimens from various collections. Of the latter, the fishes sent by John Reeves himself from Macao and Canton must be considered the most important since some of these were the actual models from which the drawings were made. Reeves' son, John Russell Reeves (1804-77), also resident in Macao, sent further specimens to the British Museum, although certain of the latter were "not figured in his father's drawings" according to Richardson ("Report", p. 189). The British Museum specimens are mostly labelled J. R. Reeves, even where the "Report" implies that they were collected by the father not the son. The remainder are merely labelled "Reeves". Richardson based 26 of his new species on specimens sent by John Reeves (or his son).

Unfortunately, the elopoid and clupeoid specimens presented by Reeves (and no doubt this is true of other groups also) were not registered, although most were listed in Günther's catalogue. The consistent omission of registration numbers on the Reeves clupeoid specimens suggests that they were presented prior to the adoption of the present registration system (in 1837). The three specimens listed here which were registered were all from the Haslar Hospital Museum. Richardson was Medical Inspector of Naval Hospitals at about this time.

A second collection of fishes studied by Richardson was that made by the Rev. George Vachell, who was Chaplain to the India Company in Macao in about 1830. The Vachell collection, of about a hundred fishes, was deposited with the Cambridge Philosophical Institution. According to Shipley (1913) the Philosophical Society Collection was transferred in 1865 to the Museum of Comparative Anatomy and

Zoology, but for several years was maintained as a separate collection. In 1866, time was spent in "overhauling these collections<sup>1</sup>, eliminating useless or decayed specimens". In 1866-67 Günther examined the Vachell, Darwin and Lowe collections of fishes at Cambridge, and he included a note on at least some of the species represented in the subsequent volumes of the *Catalogue of Fishes in the British Museum*, e.g. *Clupea fuegensis* and *C. arcuata*, but not the Darwin type of *C. sagax* (although it was evidently there since it was later (1917) transferred to the British Museum).

Richardson based 22 of his new species solely on Vachell specimens. Only one such type is involved in the present study, *Chatoessus maculatus*. However, this specimen appears to have been lost (see p. 37).

In addition to the Reeves and Vachell specimens, Richardson based a further 16 new species on specimens already in the British Museum (mainly presented by the Haslar Hospital, but a few from other sources).

Richardson's descriptions are often brief and one could wish for additional notes, especially when type designations are required. There is an interleaved copy of the "Report" in this museum, but it contains only a few short alterations or additions by Gray, who was then Keeper of Zoology. At about this time Gray had compiled a manuscript catalogue of the British Museum fish specimens. Unfortunately, only the "Chondropterygii" section was published (Gray, 1851), and the remainder appears to be lost. The Reeves specimens would have been listed here and this might well have resolved such puzzles as the disappearance of the type of *Clupea nymphaea* (see below, p. 24).

On Richardson's death, a bundle of his notes, drawings and some published figures were offered to the British Museum by his son. The notes were rejected, but the figures kept. However, the latter have little relevance to the present study, except perhaps for some tracings of certain of Forster's drawings of Australian fishes (from the second of Cook's voyages) (see below, *Megalops cyprinoides*, p. 44).

Compared with other ichthyological works of the time, Richardson's "Report" is a slender volume of a little over a hundred pages. However, some 665 species are listed from Chinese (or Japanese) waters, an enormous increase on any previous list. (Lacepède and Schneider knew about fifty Chinese species at the beginning of the nineteenth century.) Of these, 142 were described as new species or varieties. The "Report" would undoubtedly have been enriched by reproduction of the Reeves illustrations since 83 (or over half) of Richardson's new species were based solely on a Reeves drawing. But, although the "Report" was in many ways overshadowed by the *Fauna Japonica*, it dealt with certain tropical species not encountered in Japanese waters, and many of Richardson's species are still accepted today.

#### THE REEVES ILLUSTRATIONS

In the Zoological Library of the British Museum (Natural History) are certain original sets of drawings, some of which were published (e.g. the Hardwicke illustrations of Indian fishes by Gray, 1830-35). Others, such as the drawings by Forster, Parkinson and Ellis, made during Cook's voyages, have never been published. The

<sup>1</sup> This statement from Shipley (1913) does not refer specifically to the fish collections, although it is likely that they too were overhauled at this time.

Reeves illustrations, of which the Zoological Library has three sets, have also remained unpublished.

Richardson ("Report", p. 188) states that "John Reeves, Esq., who was long resident at Macao, filling an important office in the employ of the India Company, with an enlightened munificence, caused beautiful coloured drawings to be made of no fewer than 340 species of fish which are brought to the markets at Canton". Richardson then praises the drawings "which are not surpassed in the plates of any large European work of the present day". The praise is justified: some of the illustrations would not be out of place in a modern ichthyological paper. The paintings of clupeoid fishes, often finely dusted with silver and gold, are both aesthetically satisfying and at the same time are strongly indicative of painting from "life" rather than compilation from colour notes.

According to Richardson, Reeves had four sets of these illustrations made. Three of these sets are now in the Zoological Library of this museum. Comparing the three sets, it is not possible to judge whether one particular set contains the original drawings from which the other two were copied. The standard of the individual paintings varies somewhat within each set, and good and bad figures occur in each. Neither is there any indication that the same artist was responsible for all or the majority of figures in any one set. It seems that a number of Chinese artists were employed by Reeves over a period of several years.

Also in the Zoological Library is a bound volume containing a number of lists in Reeves' hand giving dates of completion of many of the drawings, and in some cases a few brief notes and occasionally the name of the artist (Akut, Akew and Asung are mentioned). The lists are written on East India Company notepaper, watermarked 1827 and 1828, and the dates given cover the period 1828-30. Also included are some receipts listing a number of fishes by their Chinese vernacular names (in Chinese script) and a pencilled note of the artist's name and the amount paid (e.g. 2-5 dollars for a dozen or more paintings).

The four sets of Reeves illustrations can be commented on briefly.

#### A. *The Reeves Set*

A bound volume of paintings with four or more fishes on each page. The pages are numbered 1-124 and each fish bears a small number, usually in red ink, sometimes in pencil. On each page these Reeves numbers run consecutively, but the order of the pages has evidently been altered, perhaps in an initial attempt to place them in systematic order. The Reeves numbers correspond with those in the lists mentioned above. The figures also bear the Chinese vernacular (presumably Cantonese) names in Chinese script, but there are no latin names (although such are used in the lists). Several illustrations are repeated (e.g. see Table 1), and in one case at least (pp. 3 and 6) almost the entire page is duplicated. At least one figure (941) is omitted in the Richardson set.

According to one source (*Anon.*, 1904), Miss Reeves, sister of John Russell Reeves, presented her father's collection of Chinese drawings to this museum on her brother's death in 1877. In the "Report", Richardson states that "Another copy, left by Mr. Reeves at Macao with Mr. Beale, formed the groundwork of the enumeration of

Chinese fish in Bridgman's 'Chrestomathy' ". This might be the copy which Miss Reeves presented, since Richardson only listed two copies in the British Museum in 1846 (but see also below).

#### B. *The Richardson Set*

A bound volume of paintings inscribed on the fly-sheet " Sir John Richardson's set of drawings of Chinese fish by native artists (one of four) prepared under the supervision of J. Reeves (used by Richardson for his ' Report ' ) " .

The drawings have been cut out from their original pages and have been remounted in the systematic order adopted by Richardson in the " Report " . The pages are numbered 1-146 and several fishes are mounted on each page. Each drawing bears a small number in red ink, corresponding with the Reeves numbers in the preceding set, and the Chinese vernacular name (in Chinese script). Each drawing is also given its latin name in accordance with Richardson's text.

The figures reproduced here are taken from the Richardson set. All are reduced to the same size.

#### C. *The Hardwicke Set*

Four bound folio volumes amongst the Hardwicke collection of drawings contain, in addition to illustrations of Indian fishes, a set of Reeves drawings of Chinese fishes. Richardson states that these drawings were presented to General Hardwicke by Reeves and had been examined " by many English and foreign ichthyologists " , including Müller and Henle. The drawings have been cut out and remounted, and they are individually numbered in pencil (1-165, 166-313, in vol. 20a and b ; 1-174, 175-317 in vol. 21a and b). In some cases the Reeves number (in red ink) and the Chinese vernacular ideogram are present. All the Reeves drawings are named and have a page reference to Richardson's " Report " . Of the elopoid and clupeoid species, three found in the previous two sets are here missing (see Table 1). In the inter-leaved copy of the " Report " in the Zoological Library, Gray has listed about 45 Reeves drawings not represented in the Hardwicke set.

The Hardwicke drawings were presented to this museum in 1835.

#### D. *The " Fourth " Set*

I have been unable to trace the fourth set mentioned by Richardson nor any other reference to such a set other than those based on Richardson's statement. It is possible that the fourth set is indeed the Beale set, i.e. the Reeves set given to Beale and lent to Samuel Wells Williams, who was responsible for the Natural History section of the Chinese Chrestomathy (Bridgman, 1841). In this work, 245 fishes are listed (15 clupeoids), but their serial numbers do not tally with the numbers on the Reeves drawings. Cantonese vernacular names are given (English and Chinese script) and also the generic names ; the latter may have been derived from the drawings, but if so, then the drawings will indeed constitute the fourth set, since the Reeves set in this museum does not bear generic names.

The fourth set is not amongst the several series of paintings of Chinese fishes in the Department of Prints and Drawings nor in the Department of Oriental Printed books and Manuscripts of the British Museum ; nor is it in the Library of the India Office in London.

A list of the elopoid and clupeoid species mentioned by Richardson (1846) showing p

Species	Richardson, 1846 (name)
<b>ELOPIDAE</b>	
<i>Elops machnata</i> (Forssk.) . . . . .	{ <i>Elops machnata</i> Forssk. <i>Elops purpureus</i> Rich.
<b>MEGALOPIDAE</b>	
<i>Megalops cyprinoides</i> (Brouss.) . . . . .	{ <i>Megalops setipinnis</i> Forster <i>Megalops curtifilis</i> Rich.
<b>CHIROCENTRIDAE</b>	
<i>Chirocentrus dorab</i> (Forssk.) . . . . .	<i>Chirocentrus dorab</i> Forssk.
<b>DUSSUMIERIIDAE</b>	
<i>Spratelloides gracilis</i> (Schlegel) . . . . .	<i>Clupea gracilis</i> Schl.
<b>CLUPEIDAE</b>	
(Clupeinae)	
<i>Sardinella aurita</i> Val. . . . .	<i>Clupea nymphaea</i> Rich.
<i>Sardinella fimbriata</i> (Val.) . . . . .	<i>Clupea isingleena</i> Rich.
? <i>Sardinella leiogaster</i> Val. . . . .	<i>Clupea caeruleo-vittata</i> Rich.
<i>Sardinella</i> or <i>Herklotsichthys</i> sp. . . . .	<i>Clupea flosmaris</i> Rich.
(Alosinae)	
<i>Hilsa reevesii</i> (Rich) . . . . .	{ <i>Alosa reevesii</i> Rich. <i>Alosa palasah</i> Russell
(Pristigasterinae)	
<i>Ilisha elongata</i> (Ham. Buch.) . . . . .	<i>Ilisha abnormis</i> Gray
(Dorosomatinae)	
<i>Clupanodon thrissa</i> (Linn.) . . . . .	{ <i>Chatoessus triza</i> Linn. <i>Chatoessus maculatus</i> Gray
<i>Konosirus punctatus</i> (Schlegel) . . . . .	<i>Chatoessus aquosus</i> Rich.
<i>Nematalosa</i> , ? <i>N. nasus</i> (Bloch) . . . . .	<i>Chatoessus chrysopterus</i> Rich.
<b>ENGRAULIDAE</b>	
(Stolephorinae)	
<i>Stolephorus commersonii</i> Lacepède . . . . .	<i>Engraulis commersonianus</i> Lac.
<i>Thryssa mystax</i> (Schn.) . . . . .	<i>Thryssa mystax</i> Schn.
(Coiliinae)	
<i>Coilia mystus</i> (Linn.) . . . . .	<i>Coilia grayii</i> Rich.
<i>Coilia playfairii</i> (Rich.) . . . . .	<i>Coilia playfairii</i> (McClelland).



bers in the three sets of Reeves drawings now in the British Museum (Natural History).

Illustrations—page nos.

Reeves	Richardson	Hardwicke	Reeves specimens
97, 99	142	30	BMNH. 1964.11.6.3
46	142	31	—
68	141	234	{ BMNH. 1964.11.6.14. TYPE*
27, 97	141	—	{ BMNH. 1853.1.4.20
33	142	237	—
—	—	—	BMNH. 1964.11.6.1
—	—	—	—
31	136	222	BMNH. 1964.11.6.6-7 (TYPE lost)
29, 95	136	219	BMNH. 1963.6.17.1 TYPE
29, 95	136	223	—
29, 95	136	—	—
102	137	220	{ BMNH. 1963.8.20.2 TYPE
96	137	221	{ BMNH. 1963.8.20.3
			BMNH. 1963.8.20.1
{ 29, 48	{ 138 upper	{ —	BMNH. 1964.11.6.4. TYPE
100	138 lower	240	
53, 54	139	232	—
91	139	233	Vachell specimen (TYPE lost)
29, 95	139	230	BMNH. 1964.11.6.5. TYPE
29, 95	139	231	—
—	—	—	BMNH. 1964.11.6.8-11
92, 97	141	236	BMNH. 1964.11.6.12
8	140	252	{ BMNH. 1855.9.19.1581. TYPE*
31	140	—	{ BMNH. 1964.11.6.2.*
			BMNH. 1847.5.10.5. TYPE*

The twenty-one species are listed here in the order adopted by Richardson (see Table 1 for correct systematic list). Synonymies list only Hong Kong, Canton and Macao references. Type specimens are redescribed, and also certain species whose systematic position is uncertain or controversial.

1. "*Clupea isingleena* Richardson"  
= *Sardinella fimbriata* (Valenciennes)

*Clupea isingleena* Richardson, 1846, *Ichth. China Japan*: 304 (China Seas).

*Spratella fimbriata* Valenciennes, 1847, *Hist. Nat. Poiss.* 20: 359, pl. 600.

*Clupea (Harengula) kowala*: Bleeker, 1873, *Ned. Tijdschr. Dierk.* 4: 147 (on Richardson).

*Harengula nymphaea*: Regan, 1917, *Ann. Mag. nat. Hist.* (8) 19: 392; Fowler, 1941, *Bull. U.S. nat. Mus.*, No. 100: 599, fig. 15; Chu & Tsai, 1958, *Quart. J. Taiwan Mus.* 11 (1 and 2): 115, pl. 3, fig. 1 [*non Clupea nymphaea* Richardson—see below].

TYPE. A fish, 108.5 mm. standard length, until recently unregistered and labelled "*Clupea nymphaea* TYPE China" (Pl. 1, fig. 1). Now recognized as the lost type of *C. isingleena* Richardson and registered BMNH. 1963.6.17.1 (see discussion below).

FIGURE. Reeves No. 60 shows a rather deep-bodied clupeoid (depth 2.75 in standard length) not unlike a juvenile *Hilsa kelee* (Cuvier) in shape but lacking any spots or marks along the flanks (Pl. 1, fig. 2). Dorsal rays vary between 12 and 14 in the three sets of illustrations, and anal rays from 9 to 12. However, the number of finrays shown in these drawings seems to conform more to aesthetic than to scientific standards. The figure shows a fish slightly deeper than either Richardson describes (3 times in length) or is the case with the actual specimen (3.1 times). But there is otherwise sufficient conformity between the figure, the description and the specimen for the three to relate to the same species. Since the drawing and the specimen are both 5½ inches, it is quite possible that the specimen was the actual model for the illustration used by Reeves' artist.

NOTES. There is no specimen labelled *Clupea isingleena* in the British Museum and Günther (1868, p. 429) reported the same. However, Günther (loc. cit.) recognized a specimen (of 5½ inches) as the type of *Clupea nymphaea* (Pl. 1, fig. 1), presumably because it was then labelled as such, and until now this has been accepted as the type of *C. nymphaea* (e.g. by Regan (1917b) in his revision). However, Günther noted that the anal ray count (21) in this specimen tallied not with the description and figure of *C. nymphaea* but with that of *C. isingleena*, as also did the size of the specimen. He then states that the "one example in the British Museum . . . belongs, on account of its oblong form, to the figure named *Cl. nymphaea*", a statement which is certainly not true of the present specimen labelled *C. nymphaea*; neither does it accord with Günther's own description of this specimen ("the height of body thrice and one sixth" in standard length). In the figure of *C. isingleena* the body depth is contained 2.75 times in standard length, against 3.65 times in the figure of *C. nymphaea* (3.1 in the actual specimen, "thrice in the length" according to Richardson's description of *C. isingleena*).

Since Richardson gave an adequate description of *C. isingleena*, based on a specimen (of 5½ inches) and on a drawing (also 5½ inches), and at the same time indicated the

museum in which the specimen was deposited ; and since there is a British Museum specimen (of  $5\frac{1}{2}$  inches) which conforms with both drawing and description in almost all respects ; then Günther's type designation must be recognized as wrong, being based on a curatorial error. The specimen in question has 8 pelvic rays. A pelvic count of 9 (described for *C. nymphaea*) is known only in one species of *Sardinella*, namely *S. aurita*, which in fact is a slender species such as is described and figured for *C. nymphaea*. In *S. aurita* too, the anal count is low (15-19 *vide* Regan, 1917b) and thus agrees with Richardson's *C. nymphaea* (A.15 vel 16) not with his *C. isingleena* (A.21).

One slight anomaly, however, is in Richardson's scute count of 16 + 10 for *C. isingleena* ; the specimen has 18 + 12, although one post-pelvic scute is very small. But even in *S. aurita* there are at least 13 post-pelvic scutes.

It must be accepted, therefore, that the specimen long known as the type of *Clupea nymphaea* Richardson is in fact the lost type of *C. isingleena* Richardson. However, the latter name, although pre-dating all other names for this species, has not been used as a senior synonym since Richardson's time and is therefore a *nomen oblitum*.

The type specimen was considered a species of *Harengula* by Regan (1917b) and subsequent workers (e.g. Fowler, 1941 ; Chu & Tsai, 1958). But it is clearly a member of *Sardinella*, having 8-10 fronto-parietal striae and upper and lower parts of the 2nd supra-maxilla similar in shape and size (see Whitehead, 1964a, 1964c for diagnosis). The vertical striae on the scales (a character used by Regan, 1917b) resemble those in *Harengula* or *Herklotsichthys*, appearing to be continuous across the scale, but in fact in most cases the inner ends of the striae do not meet in the centre but overlap each other (Chan, 1965, fig. 8). The anal, however, is too poorly preserved to judge whether the antepenultimate ray is significantly shorter than the final two rays (a *Sardinella* character). It is interesting to note that in neither Fowler's drawing (1941, fig. 15) nor in the description of this species by Chu & Tsai (1958) are the last two anal rays indicated as enlarged (" somewhat larger " according to Chan, 1965). Regan (1917b) placed emphasis on this character in his differentiation between *Sardinella* and *Harengula*, but in this species at least, it does not appear to be diagnostic.

The search for the correct name for the present species is by no means simple. Chu & Tsai (1958) list six species of *Sardinella* in the Taiwan area, as well as *Harengula nymphaea*. Of the four with 8 pelvic rays and sharply keeled scutes (i.e. excluding *S. aurita* and *S. sirm* respectively), none has a gillraker count above 63, whereas the specimen in question has 71 (or 69, Chan, 1965). A count of 69-81 and a body depth of 2.99-3.53 is given for *S. fimbriata* (Valenciennes) by Chan (loc. cit.) in his revision of the genus, and until further studies on this genus are published, this should be considered the next available junior synonym. Bertin (1944) concluded that the Valenciennes types of *Clupeonia jussieu* and *Spratella fimbriata* represented a single species (both with about 70 gillrakers). The former name has page priority over the latter, but until the identity of *Clupanodon jussieu* Lacepède is established (or the name rejected), it is best that the name *fimbriata* be retained for the present since authors have used the name *jussieu* for another species (i.e. for Bleeker's species *gibbosa* ; see also discussion in Whitehead, 1965b).

REDESCRIPTION OF TYPE OF *CLUPEA ISINGLEENA*

Standard length : 108.5 mm.

Total length : 140 mm. or 5½ inches (estimated since caudal tips damaged).

	mm.	% S.L.
Body depth . . . . .	35.2	32.4
Head length . . . . .	28.3	26.2
Snout length . . . . .	5.8	5.3
Eye diam. . . . .	8.0	7.4
Upper jaw l. . . . .	11.9	11.0
Lower jaw l. . . . .	12.4	11.5
Pectoral length . . . . .	damaged	—
Pelvic length . . . . .	11.8	10.9
Pre-dorsal . . . . .	49.1	45.3
Pre-pelvic . . . . .	59.2	54.5
Pre-anal . . . . .	88.5	81.5

Body strongly compressed, its depth greater than head length, snout less than eye diameter. Maxilla, reaching to eye centre but not to articulation of lower jaw, lower edge with a few minute denticulations ; exposed portion of maxilla with 4-5 longitudinal ridges ; 2nd supra-maxilla "paddle-shaped", upper and lower parts of expanded portion similar in size and shape, length of expanded portion equal to depth ; 1st supra-maxilla slender. Pseudobranch short, its length about  $\frac{3}{4}$  of eye diameter, ventral border without prominent ridge.

Dorsal surface of head with well-defined cuneiform fronto-parietal areas with 8-10 longitudinal striae. Bilobed dermal outgrowth on vertical portion of cleithrum and well-developed cleithral lobe along lower border of gill opening. Gillrakers 41 + 71 on first arch, about equal to gill filaments, neither upper nor lower series overlapping the other ; gillrakers present on posterior face of 3rd epibranchial.

No teeth in jaws but a single longitudinal series of fine teeth along tongue and numerous fine papillae on rest of tongue ; fine teeth present on pterygoids.

Dorsal origin nearer to snout than to base of caudal, but entire dorsal base equidistant between snout and caudal base ; dorsal rays iv 14, tips damaged. Pectoral with i 15 rays, tips damaged. Pelvic, with i 7 rays, its base under middle of dorsal and equidistant between pectoral base and anal origin. Anal with iii 18 rays, its origin a little nearer to caudal base than to pelvic base.

Scutes sharply keeled, 18 pre-pelvic, 12 post-pelvic. Many scales missing, exposed portions with fine perforations and longitudinal ridges leaving an almost pectinated posterior border (two scales from type figured by Chan, 1965, fig. 8).

*Colour in alcohol* : upper  $\frac{1}{4}$  of body brown, flanks silver, fins hyaline ; no indication of dark markings.

2. "*Clupea nymphaea* Richardson"= *Sardinella aurita* Valenciennes

*Clupea nymphaea* Richardson, 1846, *Ichth. China Japan* : 304.

*Sardinella aurita* Valenciennes, 1847, *Hist. Nat. Poiss.* 20 : 263, pl. 594 (name retained for reasons of stability—see below) ; Regan, 1917, *Ann. Mag. nat. Hist.* (8) 19 : 578 (including Günther's

two specimens of *C. melanostictus* from China—see below); Fowler, 1931, *Hong Kong Nat.* 2 (2) : 116 (compiled, no Chinese specimens).

*Clupea melanosticta* : Günther, 1868, *Cat. Fish. Brit. Mus.* 7 : 430 (2 Reeves fishes and 1 juvenile ex China).

TYPE. No British Museum specimen. As shown under *C. isingleena*, the specimen hitherto labelled as type of *C. nymphaea* (see Günther, 1868, p. 428; Regan, 1917, p. 392) is in fact the type of *C. isingleena*.

FIGURE. Reeves No.  $\beta$ 25 shows a rather slender clupeoid resembling *Sardinella sirm* or *S. clupeoides* (Pl. 1, fig. 3). It lacks any black spots or marks along the flanks such as occur in *Sardinops*. Pre-pelvic scutes are not shown, but there are 14 or 15 post-pelvic scutes (only 12 in the Hardwicke illustration). The anal base is moderate, about equal to dorsal base, and 14 rays are shown. The figure is  $6\frac{3}{4}$  inches in total length (140 mm. standard length).

NOTES. The identity of this species has hitherto remained doubtful, partly due to the confusion over the type specimen. However, Richardson describes 9 pelvic rays and this immediately excludes all species of *Herklotsichthys* (*Harengula auct.*, see Whitehead, 1964a) and also all species of *Sardinella* except *S. aurita* Valenciennes, 1847. Of clupeoid species with rather elongate bodies, *Sardinops melanosticta* (Schlegel) can be ruled out since it has only 8 pelvic rays and the series of black spots along the flanks are obvious even in long preserved material. *Sardinella sirm* (Walbaum) is similar in form to the Reeves illustration, but it has only 8 pelvic rays and there is a series of dark spots along the flank. I have found no record of *S. sirm* from the Hong Kong area. Finally, *Clupea harengus pallasii* can be considered. But although the check list given by Liang (1951) of specimens in the Provincial Fisheries Institute in Taiwan suggests that this species is present in the area, Chu & Tsai (1958), in a review of Taiwan clupeoids, found no evidence of *C. harengus* and believed that Liang's specimens were from Japan. It is most unlikely that *C. harengus* would penetrate as far south as Macao.

By elimination, therefore, Richardson's *C. nymphaea* can only be *Sardinella aurita*. Richardson's name, however, pre-dates that of Valenciennes, and should strictly replace it; it is not a *nomen oblitum*, having been in constant (mis)use. But the species is the most widespread and commercially important of all *Sardinella* species. In the interests of stability, therefore, it will be recommended to the International Commission that Richardson's name should be suppressed, and the name *S. aurita* Valenciennes retained.

There are two specimens of *S. aurita* in the British Museum which are labelled "*Clupea melanosticta* (TYPES) China Reeves". They are adult fishes (160 mm. S.L.), until now unregistered, but now BMNH. 1964.11.6.67. They were listed, as Reeves specimens, by Günther (1868, p. 430) under the name *Clupea melanosticta* Schlegel. This was a misidentification, since *C. melanosticta* Schlegel is a species of *Sardinops*. Günther included a third specimen, a juvenile of 65 mm. S.L. also from China. The latter is too small and was registered too late (1851) to have been the missing Richardson type of *C. nymphaea*.

Günther (loc. cit.) placed *C. caeruleovittata* Richardson in his synonymy of *C. melanosticta* Schlegel. Richardson lists no specimens of *C. caeruleovittata*, so the

present specimens cannot be types of that species. The original label on the bottle containing these two Reeves specimens is now missing (the bottle was relabelled after the war, presumably copied from the old label which had become detached). The designation of these specimens as types seems to have occurred after Günther had listed them. They are not types of *C. nymphaea* since Richardson only refers to a single "Specimen in Br. Mus."; neither are they the types of *Clupea melanosticta* Schlegel, which are in Leiden (Boeseman, 1947). They may, perhaps, have been sent to the British Museum by Reeves' son after the "Report" was written.

3. "*Clupea caeruleo-vittata* Richardson"  
= *Sardinella*, probably *S. leiogaster* Valenciennes

*Clupea caeruleo-vittata* Richardson, 1846, *Ichth. China Japan* : 305 (on Reeves illustr.).

*Sardinella leiogaster* Valenciennes, 1847, *Hist. Nat. Poiss.* **20** : 270 ; Kner, 1865, *Reise Novara, Fische* : 327 (Hong Kong).

? *Harengula moluccensis* : Jouan, 1867, *Mém. Soc. Imp. Sci. nat., Cherbourg*, **13** (2<sup>e</sup> ser.) (3) : 272 (Hong Kong).

*Clupea (Amblygaster) melanosticta* : Bleeker, 1873, *Ned. Tijdschr. Dierk.* **4** : 147 (on *C. caeruleo-vittata* Richardson).

*Sardinella sirm* : Fowler, 1931, *Hong Kong Nat.* **2** (2) : 119 (solely on Kner, 1865 for Hong Kong record).

**SPECIMENS.** No specimens mentioned by Richardson. There is none in the British Museum, except the two Reeves specimens labelled "*Clupea melanosticta* TYPES" mentioned under the previous species. Since Günther placed *C. caeruleovittata* Rich. in his synonymy of *C. melanosticta*, and since he listed two Reeves specimens, it is odd that these two fishes are not labelled as types of *C. caeruleovittata*. However, in certain cases, the most recent bottle label has been a copy, not of the original name on the old label, but of the name as later amended (by Günther, Regan, Norman, etc.). Unfortunately the original label has gone.

**FIGURE.** Reeves No. 59 shows an even more elongate clupeoid than the previous species, a fact commented on by Richardson (Pl. 2, fig. 1). In appearance it suggests a gravid female with distended abdomen. It resembles *Etrumeus teres* (DeKay), which occurs in Hong Kong waters (see Table 2), but the pelvics are set below the dorsal base, not well behind it. Of the remaining elongate clupeoids recorded from this area, the following can be considered : *Sardinops melanostictus*, *Clupea harengus*, *Sardinella aurita*, *S. sirm* and *S. leiogaster*. The first can be eliminated on grounds of coloration, there being no spots shown on the flanks in Reeves' illustration. The second can also be ruled out on geographical grounds (see discussion under *C. nymphaea*). The Reeves drawing is not accurate enough for a pelvic finray count, which would distinguish *S. aurita* (9) from *S. sirm* and *S. leiogaster* (8). But since *S. aurita* is already represented in Richardson's list (as *C. nymphaea*) under the Chinese vernacular name *Chang yaou lin* ("long-waisted scale" or "long fine waist"), it can be argued that *C. caeruleovittata*, the *Huang-tsih* ("yellow glossy") of the "Report", must therefore be another species. Of the two remaining elongate clupeoids, *Sardinella leiogaster* seems the more likely. It is a slightly deeper fish and lacks the row of dark blue spots along the flanks described in *S. sirm* (see Chu & Tsai, 1958).

Another possibility is *S. clupeioides* (Bleeker, 1849). Unlike Bertin (1944), Chan (1965) recognised this species as distinct from *S. leiogaster*; it has the dorsal origin nearer to snout tip than to caudal base, a feature well shown in the Reeves drawing (Pl. 2, fig. 1). However, there are no records of this species from the Hong Kong area.

*Harengula moluccensis* of Jouan (1867) from Hong Kong may refer to the present species, although "le ventre non caréné" is suggestive of *Etrumeus teres*. There are records of *E. teres* from Hong Kong (Whitehead, 1963a p. 374), and Jouan (loc. cit.) states that his fish is common (in October) (4 Hong Kong juveniles in British Museum sent by Chan). However, his pelvic count of 7 fits neither *Etrumeus* nor *Sardinella*.

Richardson's name *caeruleovittata* predates Valenciennes' name *leiogaster*. However, it has now become a *nomen oblitum*, and in view of the difficulty in making a correct identification of Richardson's species, no purpose would be served in attempting to resurrect this name.

4. "*Clupea flosmaris* Richardson"  
= ?*Herklotsichthys* sp. or *Sardinella* sp.

*Clupea flosmaris* Richardson, 1846, *Ichth. China Japan*: 305 (on Reeves' illustr.).

SPECIMENS. None mentioned by Richardson, and none in British Museum.

FIGURE. Reeves No. 64 shows a clupeoid of moderate body depth in which the scales appear to have been lost (Pl. 2, fig. 2). Fowler (1931, p. 112) identified this species with *Spratelloides delicatulus* (Bennett) although admitting that the figure (6 inches) is much too large "due to an exaggeration of the artist's drawing". The fish shown is too deep for *S. delicatulus*, and is most likely a juvenile *Sardinella* or *Herklotsichthys*. Richardson compared this fish with one described and figured in the "Description of Animals", p. 201, fig. 149 (see "Report" for note on this work.) This latter description gives the following finray counts: D 13, A 19, C 14, P 10, V 9. But the anal count, and the serrated belly in the figure, rule out a round herring; the pelvic count is virtually diagnostic of *Sardinella aurita*. However, the Reeves illustration shows an anal count of only 9, and there is no real evidence that the Reeves drawing is of the same fish as that in the "Description of Animals".

The most that can be said of this Reeves illustration is that it is of a juvenile clupeoid, probably a species of either *Sardinella* or *Herklotsichthys*.

5. "*Clupea gracilis* Temm. et Schl. F. J. Sieb."  
= *Spratelloides gracilis* (Schlegel)

*Clupea gracilis* Schlegel, 1846, *Faun. Japon. Poiss.*, pt. 5, pl. 108, fig. 2 (Japan); Richardson, 1846, *Ichth. China Japan*: 305 (? Japan).

SPECIMENS. Richardson examined a British Museum specimen (in bad condition) labelled "*Clupea gracilis*" and concluded that he could not "identify it with any of the preceding species". I have been unable to determine which specimen this

might be, but Günther (1868, p. 465) lists three Japanese specimens (registered BMNH.4.6.8134). There are Hong Kong specimens in our collection, and three Taiwan specimens have been described (Whitehead, 1963*b*, p. 343).

FIGURE. No Reeves illustration.

NOTE: I can find no published reference to this species from Hong Kong, although it is well recorded from Japan, the Philippines and also Taiwan. Fowler (1931, p. 112) reports the closely related *S. delicatulus* (Bennett) from China, but as noted earlier, this is based solely on a misidentification of Richardson's *C. flosmaris*. There are now a number of specimens of *S. gracilis* in the British Museum (BMNH. 1965.7.5.49-70) sent by W. L. Chan from Hong Kong and the species is probably not uncommon there. Whereas *S. gracilis* and *S. delicatulus* occupy roughly the same range in the Indian Ocean and along the shores of the Indo-Malayan Archipelago, in the western part of the Pacific their ranges diverge. *S. delicatulus* has the more southerly distribution, extending southwards to Tasmania, while *S. gracilis* reaches further north (to Japan). *S. delicatulus* is recorded from the Philippines (see Fowler, 1941, p. 562), but probably does not reach Hong Kong or Taiwan.

6. "*Alosa reevesii* Richardson"  
= *Hilsa reevesii* (Richardson)

*Alosa reevesii* Richardson, 1846, *Ichth. China Japan*: 305.

*Alausa reevesii*: Valenciennes, 1847, *Hist. Nat. Poiss.* **20**: 437 (dry specimen from Macao); Jouan, 1867, *Mém. Soc. Imp. Sci. nat. Cherbourg*, **13** (2) (3): 271 (Hong Kong).

*Hilsa reevesii*: Fowler, 1931, *Hong Kong Nat.* **2** (2): 115 (China, compiled; no Hong Kong specimens); Whitehead, 1964, *Bull. Brit. Mus. (nat. Hist.) Zool.* **12** (4): 141 (revision; type and Reeves and Hong Kong specimens).

*Alosa palasah*: Richardson, 1846, *Ichth. China Japan*: 306 (Reeves specimen).

*Alausa palasah*: Jouan, 1867, *Mém. Soc. Imp. Sci. nat. Cherbourg*, **13** (2) (3): 271 (Hong Kong).

TYPE. A fish, 295 mm. standard length, *ex* China, presented by J. R. Reeves, until recently unregistered, but now BMNH. 1963.8.20.2. Günther (1868, p. 447) regarded this specimen as the type and mentioned a smaller Reeves specimen (140 mm. standard length, now BMNH. 1963.8.20.3). The latter, not the former, has until now been labelled as the type in our collections, but this is wrong: the smaller specimen is not mentioned by Reeves. Both are mounted skins.

FIGURE. Of the three copies of Reeves' figure  $\alpha 8$  in the British Museum, that found in the Hardwicke set is the best, but all are adequate to identify the species (Pl. 2, fig. 3). Richardson states that "Mr. Reeves deposited a specimen in the British Museum which still retains the original label numbered in reference to his (Reeves') drawing". It is not clear from this whether the drawing (17 inches) was made from this actual specimen (15 inches). There is no label now attached to the fish, but a pencilled note on the underside of the stand on which the specimen is mounted gives the Reeves number, name, locality and collector.

NOTE. The holotype is clearly *H. reevesii*, not *H. ilisha*, having the broad operculum characteristic of the former (see Whitehead, 1965*a*). In addition, there are

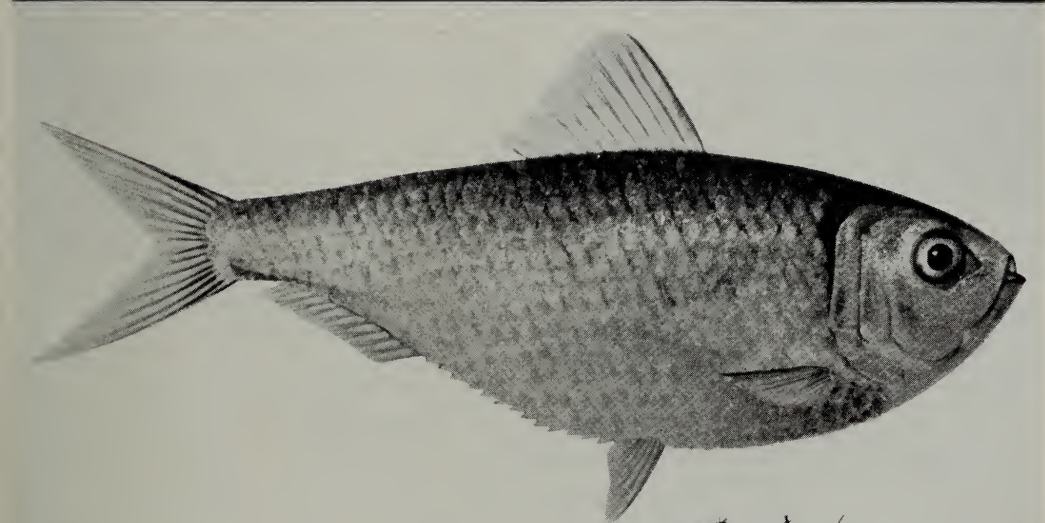
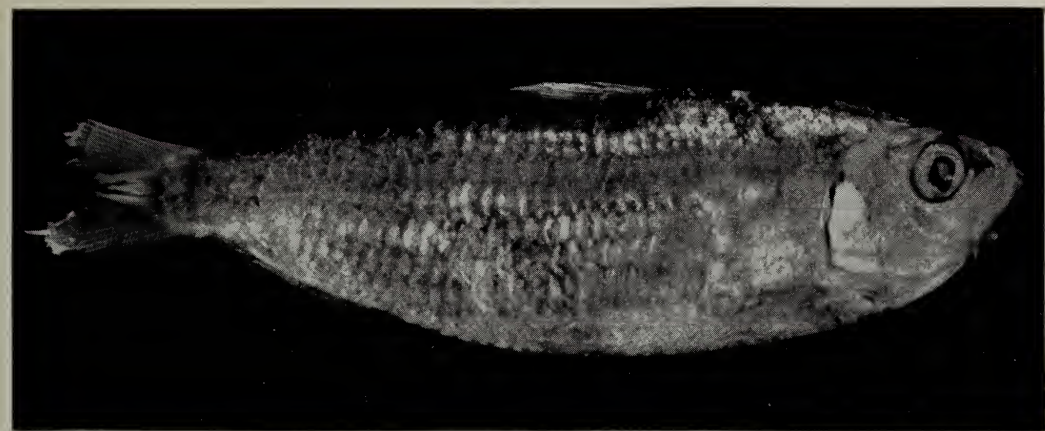




PLATE I

- FIG. 1. *Clupea isingleena* Richardson, holotype (108.5 mm. S.L., BMNH. 1963. 6.17.1). Formerly believed holotype of *C. nymphaea*, see text, p. 24.  
FIG. 2. *Clupea isingleena*, Reeves drawing No. 60 [= *Sardinella fimbriata* (Val.)].  
FIG. 3. *Clupea nymphaea*, Reeves drawing No.  $\beta$ 25 [= *Sardinella aurita* Val.]





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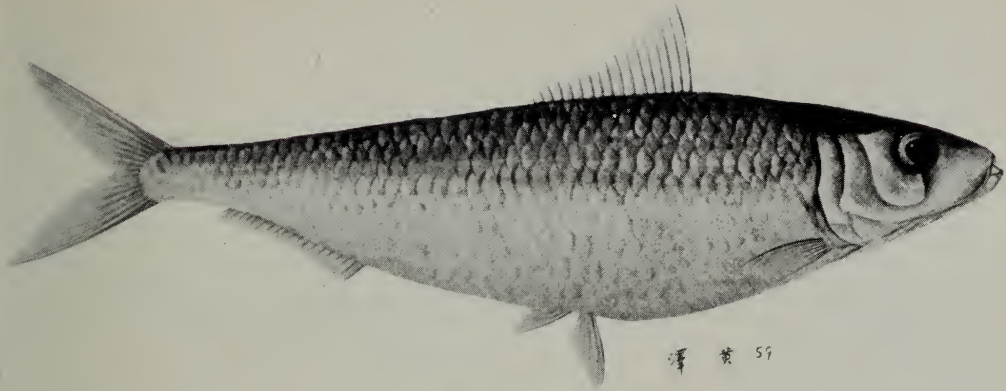


鱗腰長 256

PLATE 2

- FIG. 1. *Clupea caeruleo-vittata*, Reeves drawing No. 59 [= *Sardinella*, probably *S. leiogaster* Val.].
- FIG. 2. *Clupea flosmaris*, Reeves drawing No. 64 [= *Herklotsichthys* or *Sardinella* sp.].
- FIG. 3. *Alosa reevesii*, Reeves drawing No. a8 [= *Hilsa reevesii* (Rich.)].





澤英 59



荷海 64



三 5a

*Alm. uncinata* Raf. 305

PLATE 3

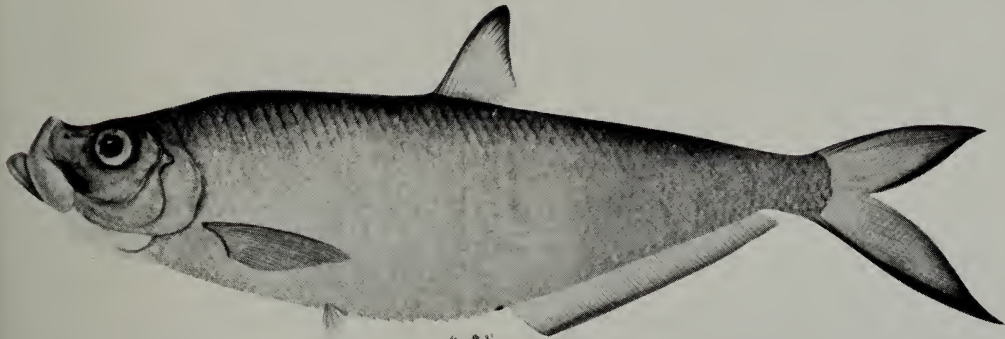
- FIG. 1. *Alosa palasah*, Reeves drawing No. 551 [= *Hilsa reevesii* (Rich.)].  
FIG. 2. *Ilisha abnormis*, Reeves drawing No. 81 [= *Ilisha elongata* (Bennett)].  
FIG. 3. *Ilisha abnormis*, Reeves drawing No. 67 [= *Ilisha elongata* (Bennett)].





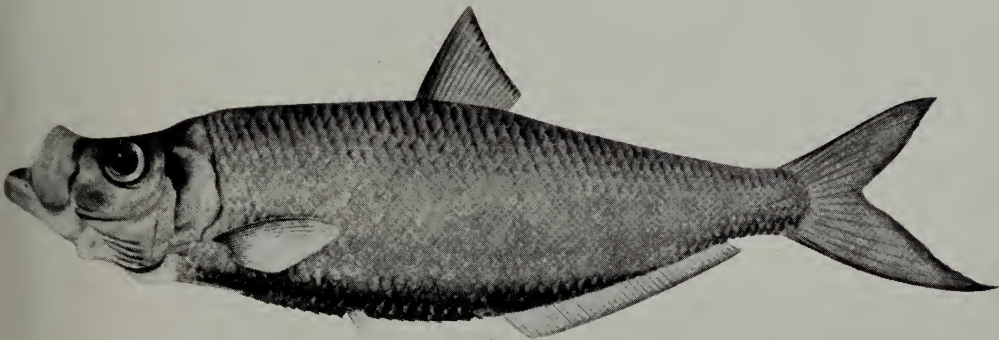
茶 51.6

*Acanthopoma* *Blk* p. 308



*Acanthopoma* *Blk* p. 308

6 ♀



*Acanthopoma* *Blk* p. 307

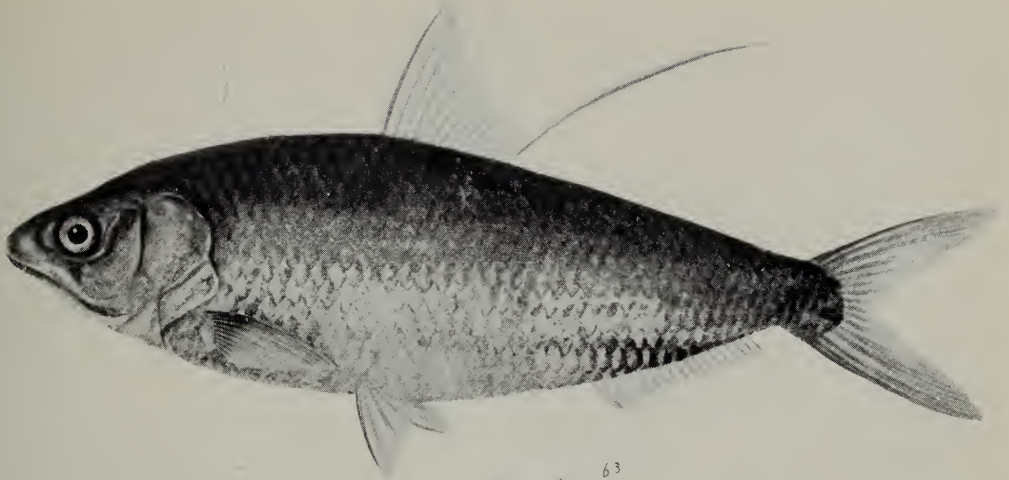
♂ 67

PLATE 4

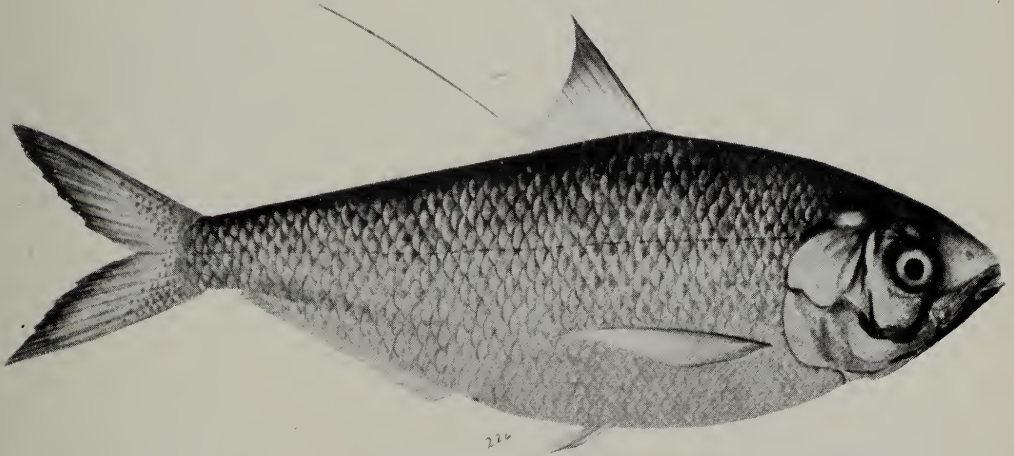
- FIG. 1. *Chatoessus aquosus*, Reeves drawing No. 63 [= *Konosirus punctatus* (Schl.)].
- FIG. 2. *Chatoessus triza*, Reeves drawing No. 224 [= *Clupanodon thrissa* (L.)].
- FIG. 3. *Chatoessus chrysopterus*, Reeves drawing No. 61 [= *Nematalosa*, probably *N. nasus* (Bloch)].





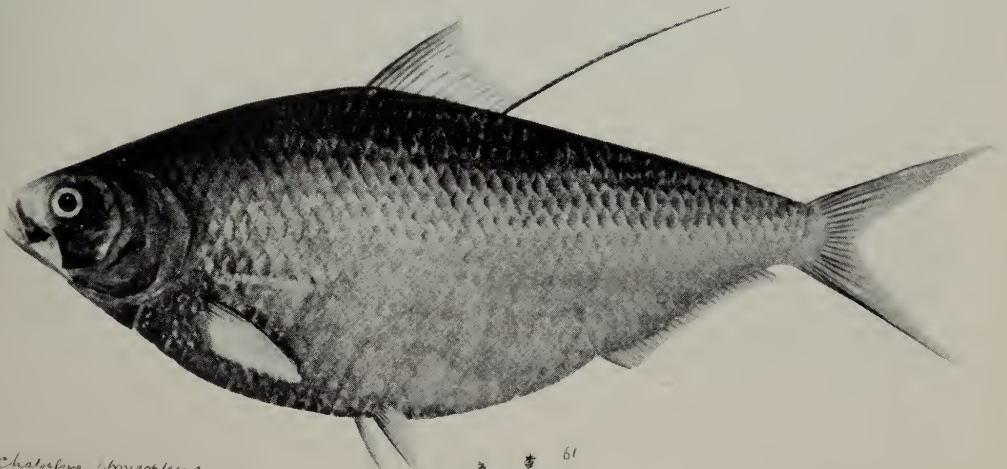


滑水 63



220

鱗腰銀



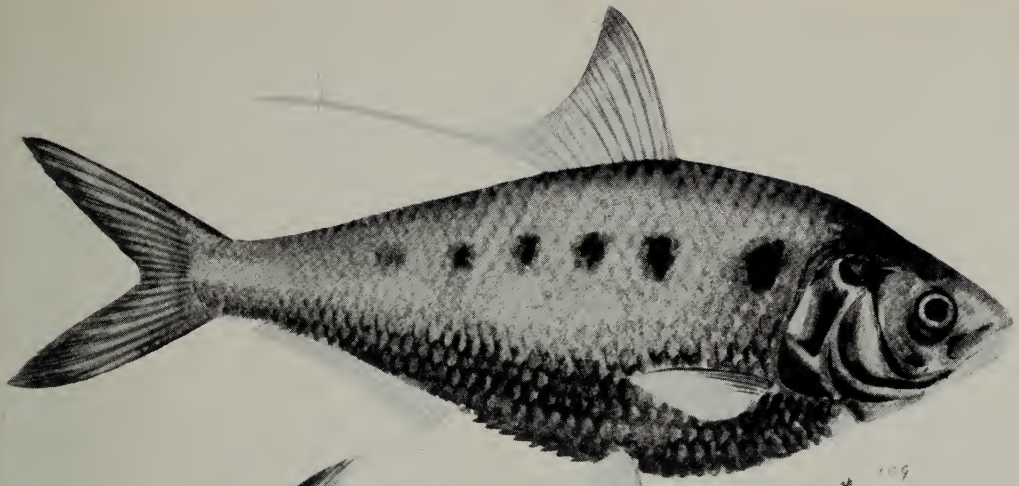
魚 黃 61

*Chalabius myoxipennis*

PLATE 5

- FIG. 1. *Chatoessus maculatus*, Reeves drawing No. 109 [= *Clupanodon thrissa* (L.)].  
FIG. 2. *Coilia grayii*, Reeves drawing No. a14 [= *Coilia mystus* (L.)].  
FIG. 3. *Coilia playfairi*, Reeves drawing No. β26 [= *Coilia playfairii* (McClelland)].



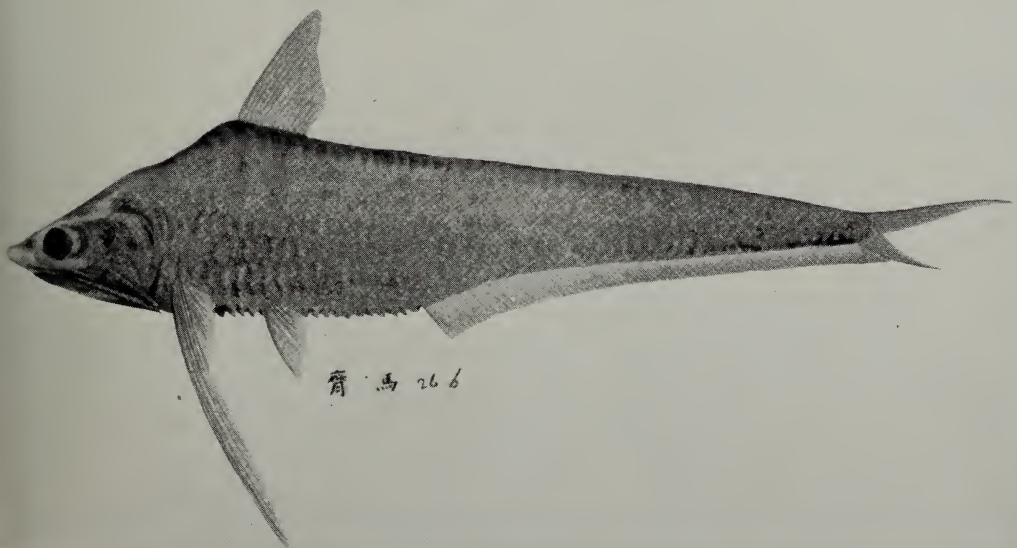


魚黃 109



尾尾 160

*Codon grayi*, Raf. 309



魚馬 266

PLATE 6

- FIG 1. *Thryssa mystax*, Reeves drawing No. 138 [= *Thryssa mystax* (Schneider)].  
FIG 2. *Megalops setipinnis*, Reeves drawing No. 96 [= *Megalops cyprinoides*  
(Broussonet)].  
FIG 3. *Megalops curtifilis*, Reeves drawing No. 130 [= *Megalops cyprinoides*  
(Broussonet)].



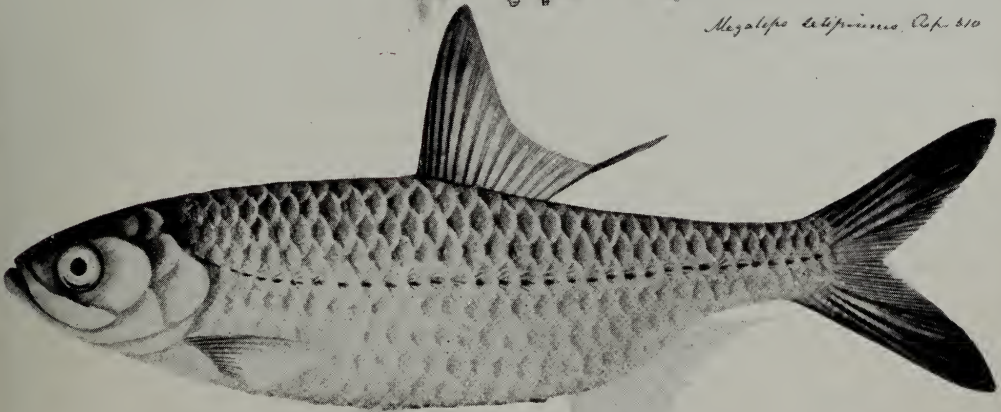


敬青 138



白普坑 96

*Megalops delipinnus*, Raf. 210



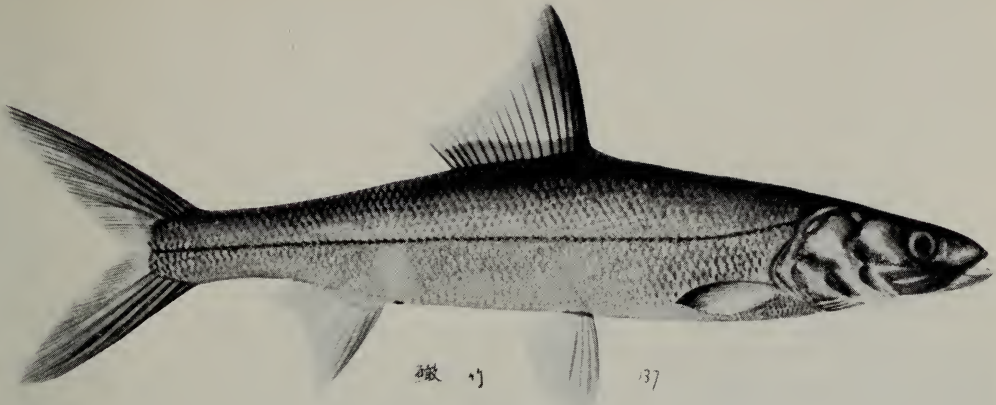
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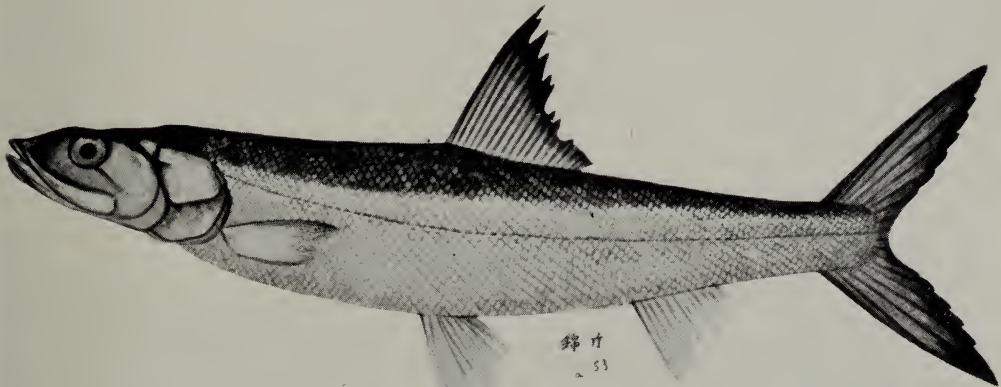
PLATE 7

- FIG. 1. *Elops machnata*, Reeves drawing No. 137 [= *Elops machnata* (Forsskål)].  
FIG. 2. *Elops purpurescens*, Reeves drawing No. 53 [= *Elops machnata* (Forsskål)].  
FIG. 3. *Chirocentrus dorab*, Reeves drawing No. 47 [= *Chirocentrus dorab* (Forsskål)].





*Elops machanata*. Raf. p. 311



*Elops punctatus*. Raf. p. 311



*Cheimarras diabolus*. Valenciennes p. 311